Better Crops WITH PLANT FOOD

November 1937 10 Cents

The Pocket Book of Agriculture

AVAILABLE LITERATURE

The following literature on the use of fertilizers in profitable soil and crop management is available for distribution. We shall be glad to send these upon request and in reasonable amounts as long as our supply lasts.

Circulars

Potash Pays on Grain (South)
Greater Profits from Cotton
Tomatoes (General)
Asparagus (General)
Vine Crops (General)
Sweet Potatoes (Mid-Atlantic)
Southern Tobacco Recommendations
Grow More Corn (South)
Fertilize Potatoes for Quality and Profits (Pacific Coast)
Fertilizing Small Fruits (Pacific Coast)
Fertilizing Citrus Fruits (Pacific Coast)
Potash Hungry Fruit Trees (Pacific Coast)
Better Corn (Midwest) and (Northeast)

Reprints

K-2 Potash Increases Corn Yields Following Sweet Clover
A-4 Recent Developments in Fertilizing Muck Soils
H-5 Connecticut Valley Soils Need Potash
I-5 Apple Trees Need Balanced Diet
B-6 Potash and Clover for Better Pastures
C-6 A Good Lawn Is Its Own Reward
G-6 Profit Factors in Flue-cured Tobacco
I-6 Virginia Tobacco Needs Potash
J-6 Soybean Trends
K-6 Fertilizing Pennsylvania Cigar-leaf Tobacco
M-6 Fertilize to Control Cotton Wilt and Rust
N-6 Side-dressing Corn with Potash (Ill. and Iowa)
S-6 Potash for Cotton Wilt and Rust in South Mississippi
V-6 Fertilizer Needs of Red Raspberries
W-6 Strawberries Can Be Profitable (Del.)
X-6 We Did "Sumpin" About It (Cotton)
AA-6 Meet Our Old Friend Timothy
BB-6 Potash and Cotton Wilt in Central and North Mississippi
CC-6 Southern Peaches Need Potash
DD-6 Mr. Ben Qualifies as Truck Planter (South)
FF-6 Fertilization and Care of Peat Soils
GG-6 Potash for Cotton Wilt in the Mississippi Delta Region
JJ-6 Potassium Availability in Illinois Soils
KK-6 Fertilizers and Farm Chemurgy
LL-6 Experiments Reveal Soil Deficiencies (Cotton)
MM-6 Quality Yields Make Cash Crops Pay (Midwest)
NN-6 Ohio Checks Fertility Needs of Vegetables
OO-6 Fertilized Legumes Pay Big Profits
PP-6 Deciduous Orchards Need Plant Food
QQ-6 Fertilizer Distributors for Seed Drills
TT-6 Give Peat Soils Required Potash
UU-6 Alabama's "Garden Spot" (Truck Crops)
A-7 Permanent Grassland Has Cash Value
B-7 Excess Soluble Salts in Greenhouse Soils
C-7 Better Sweet Potatoes for South Carolina
D-7 Successful Strawberry Practices in the South
E-7 California Prunes Respond to Potash
F-7 Good Reasons for Fertilizing Corn (Midwest)
G-7 Mineral Fertilizers for Pasture Improvement
H-7 Potash for Cotton in the Delta Foothills
I-7 The Family Garden Deserves Planning
J-7 Meet Indiana's 1936 Onion King
K-7 The Tung Oil Industry in Mississippi
M-7 Better Crops of Better Quality (Corn)
N-7 Will Potash Benefit Your Apple Orchard
O-7 Prevent Blackening of Irish Potatoes
Q-7 The Agricultural Future of Puerto Rico
R-7 Results with Potash in Eastern Virginia
S-7 Growing No. 1 Tomatoes for Hoosier Canners
U-7 Fertilizers for Better Asparagus (Northeast)
V-7 Feeding Cattle Minerals Through Better Pastures
W-7 A Modern Pioneer—J. W. Hadden (Cotton)
X-7 On Apple Orchards Use "Congenial" Fertilizers (Northeast)
Y-7 Asparagus in Ontario
Z-7 Apply Boron to Prevent Darkening of Turnips
AA-7 Potato Improvement in Wisconsin
BB-7 Fertilizer Response on Colby Silt Loam
CC-7 Replace Plant Food Losses in Crops
DD-7 Circle M Ranch Makes A Profitable Comeback
EE-7 The Role of Potash in California Soils
FF-7 High Potash Fertilizers Grow Better Tomatoes
GG-7 Shall It Be Soil-mining or Soil-building
HH-7 High Potash Fertilizers for Fall Use
II-7 Fertilization of Bulb Plants.
JJ-7 Atkinson Demonstrates That It Can Be Done
KK-7 Minor Elements in Cotton Fertilizers
LL-7 Fertilize to Control Cotton-belt Erosion
Orchard Fertilizer Practices Determined by Diagnosis
How to Determine Fertilizer Needs of Soils
Some Results of Mineral Deficiency Studies

AMERICAN POTASH INSTITUTE, INC.
INVESTMENT BUILDING **WASHINGTON, D. C.**

Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Editor*

Editorial Office: Investment Bldg., Washington, D. C.

VOLUME XXI NUMBER ELEVEN

TABLE OF CONTENTS, NOVEMBER 1937

Brawn and Bang-boards 3
Jeff Reviews the Corn-huskers

Better Yields of Better Cotton 6
Spell Progress in South Carolina, Says A. B. Bryan

Diagnosing Fertility Needs of Orchards 9
Nutrient Disorders Discussed by J. H. Weinberger

Potash Enters the Dairy Business 13
F. H. Jeter Tells a Corn Story

We Met the Change in Burley Tobacco 15
H. G. Kolb Commends Quality Production

1937—A Cotton Year of High Records 18
As Reported by C. B. Sherman

Crotalaria Is Good for Southern Soils 20
Convincing Evidence Presented by E. B. Ferris

Editorials 27

Reviews 29

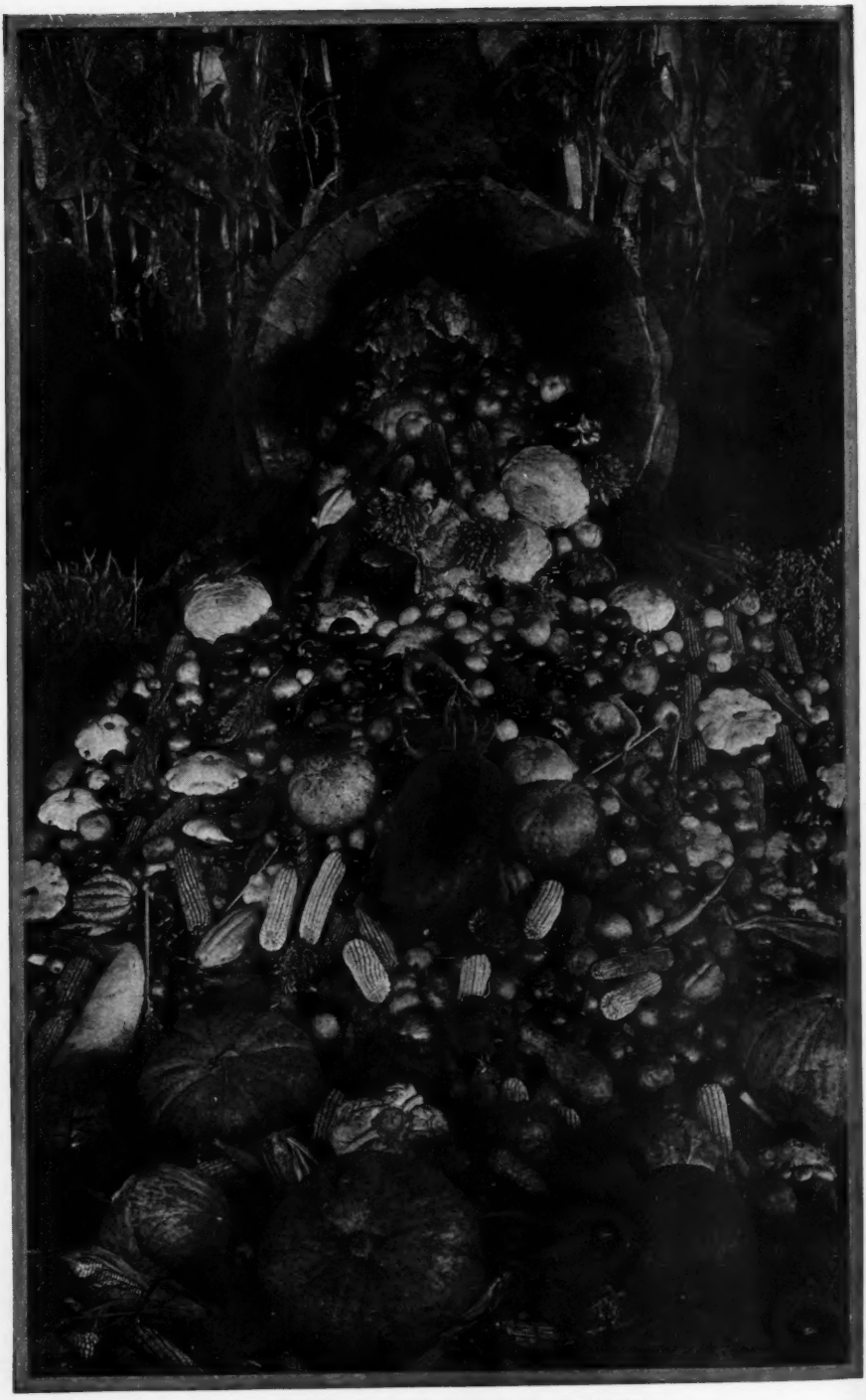
Crops Are Well-fed on Craigmile Farms 39
George R. Harrison Describes the Method

American Potash Institute, Inc.

Investment Building, Washington, D. C.

J. W. TURRENTINE, *President and Treasurer*

G. J. CALLISTER, *Vice-President and Secretary*



". . . AND FOR THESE, WE GIVE THANKS."

Better Crops with PLANT FOOD

PUBLISHED FOR THE AMERICAN POTASH INSTITUTE, INC., INVESTMENT BUILDING, WASHINGTON, D. C. SUBSCRIPTION, $1.00 FOR 12 ISSUES; 10c PER COPY. COPYRIGHT, 1937, BY THE BETTER CROPS PUBLISHING CORPORATION.

VOL. XXI WASHINGTON, D. C., NOVEMBER 1937 No. 11

Brawn and Bang-boards

Jeff McDermid

OUR king plant, *Zea Mays*, has brought us another gift of great abundance and comforting sustenance, stored away in brown, rustling wrappers on the mother stalks, after ninety to one hundred days of blistering sun, welcome rain, and diligent cultivation. It's almost like a Christmas or a birthday gift. All we have to do now is to open the packages. That's the thing I want to chin about.

In the simple legendary annals of Indian lore in the times known as B. C. (before Columbus) the innocent red brethren grew corn fields twenty miles long, but not so particularly rich in acre yield. They were not bothered about its being a soil-depleting crop like we are, nor did they inhale so much of it in liquid form after the customs of today. Yet authorities so far apart in literary style as poets and anthropologists and archaeologists agree in the main that the redskins made quite a fuss over harvest festivals, in which the glorious corn plant was transformed into a demi-god.

I cannot clutter up this passage with any authentic scientific documents, but I pause to quote a few revealing lines from Longfellow anent the adventures of Hiawatha whilst engaged in growing and shucking the bounteous maize.

If you recall the story of the poem, Hiawatha met and wrestled regularly

for a certain period of time with the mighty Mondamin, corn-god of the tribesmen. Finally Hiawatha threw the marvelous adversary prone upon the ground, with "plumage torn and garments tattered." Acting upon previous instructions, the Indian hero made a grave for the corn-god and "laid him in the earth and made it soft and loose and light above him."

At this spot Hiawatha watched every day while the green shoots emerged and turned into the mature corn plant, a typical resurrection from the dead. Then Hiawatha and the braves learned to grow and depend upon this great gift, and of the husking at the harvest, Longfellow wrote:

"And still later, when the autumn
Changed the long green leaves to yellow,
And the soft and juicy kernels
Grew like wampum hard and yellow,
Then the ripened ears he gathered,
Stripped the withered husks from off them,
As he once had stripped the wrestler,
And made known unto the people
This new gift of the Great Spirit."

Since those ancient, legendary days, the corn plant has not changed very much in its outward appearance or manner of growth, but mankind has surely changed the methods used in unwrapping the packages.

GOING afield with corn knives and sickles, our elders mowed down the tough and resistant stalks and then embraced them with sinewy arms to make huge, wigwam-like shocks, arranged in rows down the autumnal fields. The haze in the October and November atmosphere resembled the eerie smoke from vanished Indian campfires, and those gaunt and wind-blown relics of a bumper season stood awhile before the advent of the hauling racks or the patient huskers.

Trying to make the most of every occasion for a frolic and a reunion of hearty wits, our ancestors soon made keen sport of the annual husking time. They sought to forget the bitter winds and the frosted pumpkins in a bit of relaxation with piles of stalks before them and bushel baskets on either side. Even today in my rambles up-state, I see a few crouched figures squatting among the brown shocks, sorting out the nubbins from the heavy ears, and thinking how much richer the yield had been with more plant food in the seed hills.

FARMERS, according to their regional customs and preference, have varied the husking methods considerably. Sometimes they let the livestock "hog down" the crop. In our intensive dairy areas the silo and the husker-shredder seem to have weaned the operators away from the husking peg. Yet in a vast stretch of country known as the corn belt, standing corn-husking is still the common way, using wagons with high racks and bang-boards at the ends to catch the high-flung ears tossed in by the most rapid rippers.

I am rather sorry that some of our honored rural programs are no longer popular, among them the jolly husking bee. Aside from the communion of rare spirits, both mental and liquid, the verve of such events was pronounced by reason of the rollicking red-ear kiss provoker. I did not share in this sport, unfortunately, but many a man has gone to such parties armed on the sly with "calico" corn and Northwestern dent, so he might be the lucky claimant of an osculatory privilege.

As the kiss became harder to obtain with the expanding use of pedigree seed stock, mostly straight white or golden yellow, something had to be devised in order to make more frolic out of the irksome job of opening the endless corn packages.

This finally led our modest agri-

cultural secretary at Washington, then an Iowa corn breeder, to conjure up the modern sport of bang-board, open field-shucking contests. They are now the *sine qua non* of agricultural athletics, or something like that.

Whether he felt personally bereft because of the decline of the ruddy ear and its ruby counterpart, the history of Polk County, Iowa, telleth not. I may get him to grant a newspaper hearing on that issue before he gets too much het up in the ever-normal granary, but let's get on with the yarn.

We should be as proud to recount the deeds of our brawny huskers as we are to hoot ourselves black in the face when some hunky digs a groove in the sod with his snoot in a football classic.

BACK in 1923, farm folks quit speculating about the McNary-Haugen bill and export debentures and had their eyes glued on the first interstate corn-husking contest known to history. Over in western Illinois a "kid" about 20 years old, weight 160 pounds, named Dallas Paul, had given a private sketch of his own in a convenient corn field, and hung up a 10-hour record of husking 235 bushels of ear corn. This was conceded as mighty near professional caliber, so some of his friends wagered that nobody in overalls could equal Paul's fling feat. However, Iowa also had a runner-up that year, a 28-year-old rustic with a gnarly wrist measuring seven and three-fourths inches in circumference, and so the Hawkeyes chortled at the Suckers and accepted their challenge with the new state champion bang-board artist, John Rickelman, of Lee County. After the necessary insulting preliminaries, somebody paid Paul's expenses over to Des Moines, and there Henry Wallace gave his blessing to the first interstate tussle amid the tassels.

It seems that the crowd was not satisfied with the first regulation heat of 80 minutes husking, so they hollered for a second round, and the grimy, sweaty state champions went at it again for an extra hour. When the "shavings" were all sorted out and the balance struck on the net weights, Paul had lost seven bushels and Rickelman about six bushels on penalties. This left the contest in the scales of justice for half an hour, while the judicial committee retired for a guzzle. When they emerged with the official score, Rickelman won with 44.5 bushels to 40.5 bushels chalked up for Paul in two hours and twenty minutes running time.

Both men were well steamed up and going strong, even though the corn ears were not very large, about 180 to the hundredweight. Yet the bang-boards had to stand some stiff punishment, because both huskers were throwing an average of forty-five ears a minute when the gun-shot ended the battle. At that time in Iowa, about the only chap who could equal Rickelman's pace was Grimmius of Grundy, but both men finally passed into oblivion as the scene shifted to new champions.

In 1924 the interstate struggle took

(*Turn to page* 47)

Better Yields of Better Cotton

By A. B. Bryan
Clemson Agricultural College, Clemson, South Carolina

THE biggest story in South Carolina farming in the last decade, says a recognized authority, is the story of improvement in cotton production. First is the decided improvement in yield per acre in the face of the boll-weevil, yields for 1924-28 inclusive averaging 186 pounds per acre for the state, while yields for 1932-36 inclusive averaged 251 pounds per acre. Equally significant is the long stride in staple improvement—from the predominance of 7/8-inch staple to that of 1-inch or better. In 1929, less than a decade, only 36.7 per cent of South Carolina cotton was 15/16-inch or longer, and in 1936 this length of staple had risen to 94.7 per cent, 72 per cent of the 1936 crop being 1-inch or longer.

Much of the advance, as to yields and staple length, may be credited to the 5-acre cotton contest conducted every year but 2 since 1926 by the Extension Service of Clemson College and to efficient seed breeders.

The chief aims of the South Caroline 5-acre cotton contest are indicated in the contest slogan: "For better yields and staple lengths," that is, the more economic production of greater yields per acre and the production of improved staple lengths so that the mills of the state may have home-grown cotton such as they need in the manufacture of superior cloths.

"Uncle Bob" Smith, Johnston, South Carolina, four times a prize winner in the cotton contest; and his wife, Mrs. Carrie B. Smith, first prize winner in 1936.

In 1925 a survey by the Extension Service showed that less than 20 per cent of South Carolina cotton was 15/16-inch or longer. The requirements of the mills of the state for such lint were being met by cotton shipped in from other areas, and most South Carolina cotton of shorter staple was being exported from the state. Furthermore, the average per-acre yield of cotton in the state was only 152 pounds, a yield economically not profitable, as data on cost of production will show conclusively.

Hence the contest—"for better yield and staple value"—begun in 1926 with prize money totaling $2,000 donated by *The State,* Columbia, a progressive daily newspaper, through the Extension Service. Since that year, except in 1932 and 1933 when no contests were held, the Cotton Manufacturers Association of South Carolina has generously donated $2,000 each year for prize money to help carry on this big job of cotton improvement.

Bryce Gainey, Darlington County 4-H Club boy, who won first place in the Darlington County section of the long-staple contest.

Progressive Figures

That real progress has been made is shown by interesting facts and figures from the records of R. W. Hamilton, extension agronomist and assistant to the director, who has directed the contest work with energy, enthusiasm, and fine judgment since it was begun in 1926.

With less than 20 per cent of South Carolina cotton 15/16-inch or longer in 1925, there was 36.7 per cent of such lengths in 1929, 76 per cent in 1932, and 94.7 per cent in 1936. Better still 72 *per cent of the state's cotton in* 1936 *was* 1-*inch or longer.*

These figures put South Carolina in the lead of the other cotton states in the production of cotton 15/16-inch or longer. North Carolina's percentage has risen from 24.4 per cent in 1929 to 87.9 per cent in 1936; Georgia's from 10.8 per cent to 56.1 per cent. The percentage of 15/16-inch cotton for the United States was 64.1 per cent in 1936.

The rise from a yield of 152 pounds in 1925 means lower cost per pound comparatively, and therefore greater profit to the producer. Material aids toward this improvement in yields per acre have been the better cultural practices taught in the contests, such as closer spacing, better-yielding varieties, judicious fertilizing, and diligent fighting to control the boll-weevil.

The cotton contest is of course only one of several agencies that have brought about these profitable results of higher yields and longer staples. There are the seed breeders, the research activities of the South Carolina Experiment Station, the progressive farmers who cooperate for personal and public good.

The increase of 65 pounds of lint per acre, as shown in these 5-year aver-

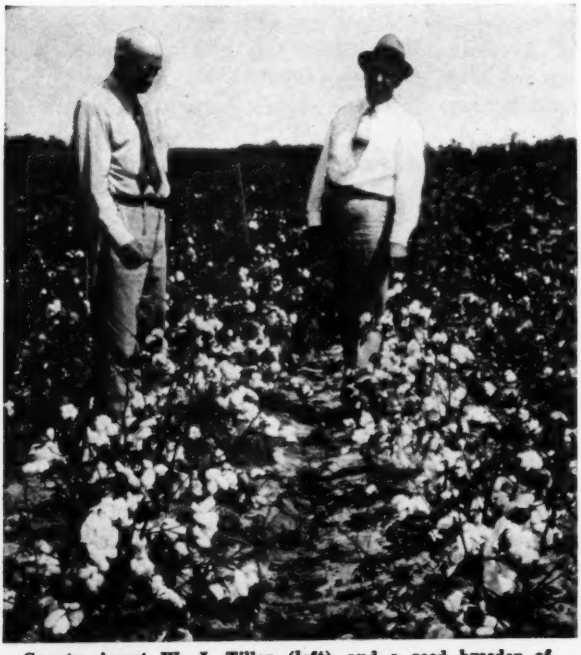
ages, at 12 cents per pound means an increase of $7.80 per acre in lint value; and 25 per cent of that would mean an increase of $2,730,000 in the value of the 1936 crop alone.

As to the prize money, if the increase in staple length since 1925 is valued at only ½ cent per pound, for the state's 1936 crop of 800,000 bales, the total increase in value due thereto would be around $2,000,000. This for 1 year only! What a dividend on the prize money which for the entire 9 years of the contest has totaled only $18,000!

The improvement in the quality of the cotton grown by the contestants themselves from 1926 to date is emphasized by figures on the staple lengths of the cotton produced in the contests. In 1926, first year of the contest, 54.6 per cent of the lint grown on contest plots was short cotton, that is, 7/8-inch or less; by 1935 only 1.9 per cent was of these short lengths. On the other side of the picture, the percentage of lint 15/16-inch or longer produced by the contestants increased from 40.8 per cent in 1926 to 98.1 per cent in 1935. In 1936 there was a slight drop from this high figure to 95.8 per cent, still a very high percentage of superior lint.

And most interesting is the fact that only five of the varieties used by contestants in 1936 averaged as low as 31/32 inch, four varieties averaged 1 inch, one averaged 1 inch plus, one 1 1/32 inches, one 1 1/16 inches, one 1 3/32 inches, one 1⅛ inches, and two averaged 1 3/16 inches. Most interesting and significant also is the fact that the prize winners in 1936 all made cotton measuring over an inch in staple length, one winner's cotton measuring 1 1/16 and the other's all 1 1/32.

In the first year of the contest, many farmers thought that the only thing necessary for a large yield was a large amount of fertilizers per acre, and that the contestants using the largest amount would make the highest yield. Actual results have shown that rainfall or climatic conditions, fertility of soil, stand or number of plants per acre, and insect and disease infestation are other factors of great importance. Contestants have realized this, and the amount and kind of fertilizer used on contest plots averages in pounds of plant food per acre, 20 to 48 pounds of phosphoric acid, 18 to 28 pounds of ammonia, and 12 to 24 pounds of potash.



County Agent W. J. Tiller (left) and a seed breeder of Chesterfield County are inspecting P. M. Arant's cotton in the State 5-acre contest.

(*Turn to page* 45)

Diagnosing Fertility Needs of Orchards*

By J. H. Weinberger
Assistant Pomologist, U. S. Horticultural Field Station, Beltsville, Maryland

NITROGEN, phosphorus, and potassium are the elements usually thought of as fertilizers for orchard trees. These are the elements that are most often lacking for plant growth in soils in this country. However, there are eight other mineral elements that have thus far been found necessary for the successful growth of a fruit tree. If the soil lacks any one of these, the trees can not survive and definite disorders or symptoms are produced in the tree by which it is often possible to diagnose the cause of the trouble. A fertile soil must necessarily contain an adequate available supply of all essential elements, and most orchard soils in Maryland are deficient only in nitrogen.

Deficiency Symptoms

In many sections the disorders caused by lack of one or more of these elements are of considerable economic importance. For example, a yellow mottling of the leaves and a rosette of peach, citrus, and other fruit trees in California are cured by applying zinc sulfate to the soil. A similar disorder affects apple trees in Washington and pecan trees in the South. In South Africa ¼ to 2 pounds of copper sulfate per tree is applied to the soil to overcome chlorosis (loss of green coloring matter or chlorophyll) and rosetting of peach trees. In Florida, die-back of citrus trees is controlled by application of copper salts. Die-back and chlorosis of prune trees in California are associated with deficiencies of potassium in the soil. Leaf scorch of apples in Massachusetts is also associated with potassium deficiencies. In parts of California and Florida manganese is regularly applied to citrus trees to overcome chlorosis. In any part of the country trees on a high-calcium soil may suffer from a lack of available iron. Internal cork and certain types of drouth spot of apples are physiological disorders which are associated with nutrition.

It is possible to produce these symptoms of mineral deficiency under controlled conditions. In order to be able to identify them when they occur in the field, 1-year-old peach trees were grown in sand supplied with a series of nutrient solution in each of which, one particular element was lacking. In this way definite disorders were produced whose cause could be identified. Most of the observations reported here were made on peach trees grown under controlled laboratory conditions at Beltsville, Md. (7). Description of deficiency symptoms of apples are taken from the reports of Wallace (6) on behavior of trees in the field and in sand cultures.

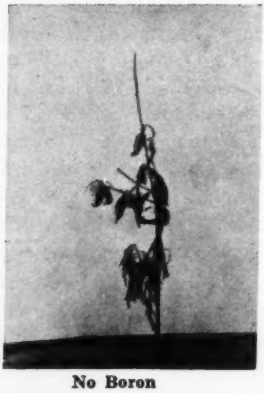
By far the most important element in the fertilizing of orchard trees is nitrogen. This element is easily leached out of the soil and under Maryland conditions trees respond most readily to applications of nitrogenous fer-

* Reprinted from Proceedings of the Maryland State Horticultural Society.

No Potash

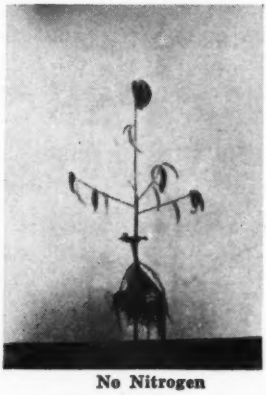
Complete

No Phosphorus



No Boron

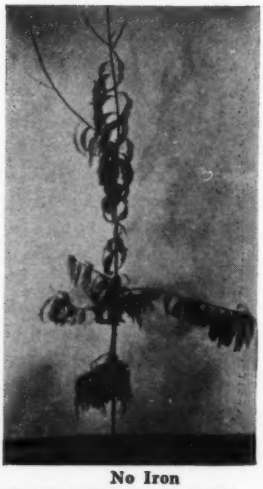
No Sulfur



No Nitrogen

No Magnesium

No Calcium



No Iron

Elberta peach trees grown in sand culture supplied with nutrient solution lacking the element indicated.

tilizers. When the nitrogen supply in the soil is low the trees lack vigor, terminal growth is short, few leaves are formed, and few fruit buds are differentiated. Leaves are small, yellowish green, much twisted and curled, and develop reddish tints and reddish brown spots. Leaf and blossom buds are slower to open in the spring and defoliation takes place earlier in the fall. The flowers are weak, often do not set, and if they do set, the fruits are apt to drop. The fruits ripen earlier, are smaller, and usually highly colored. Nitrogen starvation is apt to appear in sod orchards or on shallow soils. It is the most easily controlled deficiency and seldom proves fatal to the tree.

Phosphorus and Potash

Phosphorus deficiency on fruit trees has seldom been reported under field conditions. When peach trees are grown in pure sand supplied with a nutrient solution lacking phosphorus, they stop growth early in the season, but appear perfectly healthy. The leaves are large, dark green in color, and have a tough, leathery appearance. They lack the bright green color of leaves on a vigorously growing tree. In severe cases shoot growth is small, leaves are small, and defoliation occurs early. Wallace (6) reports that on apples fruit size is reduced, as in nitrogen starvation, but the fruits are poor in quality and have a dull, bronze finish. In certain soils in England, where the phosphorus supply is so small that pasture plants cannot grow healthily, fruit trees show no sign of phosphorus deficiency.

When available potash is scarce in the soil, the effects on the trees are less drastic than from nitrogen deficiency but are more serious because of the difficulty of control. Terminal growth may be just as great on potassium starved trees as on others, but the twig diameter is smaller and the leaves are spaced farther apart, giving the tree a spindly appearance. The distinguishing symptom of potassium deficiency is the "leaf scorch" which develops when the margins of the leaves die, and the dead tissue falls off in ribbons. In the center of the leaf small spots of dead tissue appear also. The leaves are light green in color, smaller in size, and seem thin, brittle, and papery. The edges of the leaves are curled inward. Sometimes a chlorosis appears in the leaves near the margins and between the veins.

With apple trees as reported by Wallace (6), defoliation occurs early, the leaves at the twig tips dropping off first. In severe cases the tips of the branches may die back. Blossom buds are formed and may set, but the fruits are small and of poor flavor. In mild cases, applications of potassium fertilizer to the soil will correct the trouble, but in severe cases recovery is more difficult, and often death of the tree results. In any potash fertilization it is important that the fertilizer be placed as close to the roots as possible, since this element is quickly combined in the soil and rendered unavailable.

Calcium and Magnesium

A simple calcium or lime deficiency of fruit trees does not often occur in the field. Calcium-starved trees grown in sand cultures have large, deep green leaves which tend to be stiff and to roll the edges inward. Late in the season a large area of dead tissue, usually in the center of the leaf, becomes yellow and quickly dies. The injured leaf soon drops off. Shoot growth may or may not be normal. So far as has been observed with apple trees by Wallace (6) bark, blossoms, and fruit are normal.

Magnesium deficiency symptoms are quite similar to calcium deficiency symptoms, except they are more severe, and breakdown usually occurs in areas between large veins. Unless large amounts of iron are available, chlorosis is apt to occur also. Defoliation follows the appearance of break-

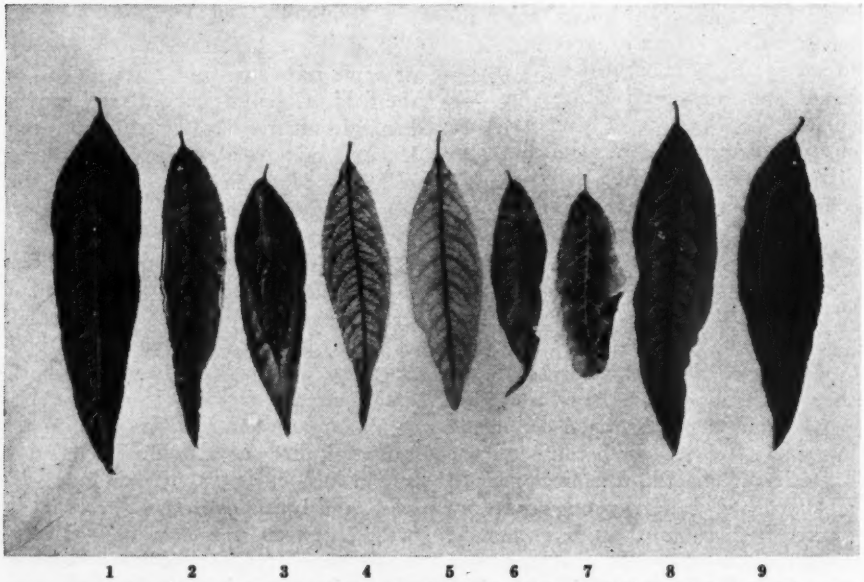
down in the leaves, the old leaves dropping off first. New foliage is continually being produced, but it, too, is soon affected and drops off. Apple fruits are woody and fail to mature because of lack of foliage.

Where iron is lacking or is unavailable in the soil, severe chlorosis results. The veins, as well as the areas between the veins, lose their green color and may even become almost white before they drop off. The leaves at the tip are lost first, as contrasted to the older leaves lost first on no magnesium treatment. Lack of iron under field conditions may occur where considerable calcium carbonate or limestone is found in the soils or in the rock from which the soil is derived. Although the soil may be high in iron content, the iron may be rendered unavailable to the trees by the action of the excess lime. Iron chlorosis on peach trees also occurs readily in sand cultures when potassium, calcium, or manganese are lacking and iron supply is low. Under these conditions, if the trees are given either iron or one of the other elements, the trouble may disappear.

No disorder of fruit trees due to a lack of sulfur has been reported, and where trees are sprayed with sulfur for the control of diseases, there is likely to be none. However, sulfur is an essential element, and fruit trees growing in its absence soon stop growth. With peach trees the terminals die and new shoots start out below the tip, which are small and produce only small, light green leaves. These later assume red or orange tints. The older leaves turn light green, resembling low-nitrogen leaves, and later large areas of the leaves at the tips or margins die, shrink, and distort the leaves. Defoliation does not occur until late in the season.

Most soils contain ample supplies of manganese, and the cause of manganese deficiency disorders usually lies with certain soil conditions, which render manganese unavailable to plants. High-lime content is a common cause, as with iron deficiency. With peach trees, lack of manganese produces a dull, yellowish green color on the

(*Turn to page* 43)



1 2 3 4 5 6 7 8 9

Leaves from trees grown in sand culture supplied with nutrient solution deficient in (1) complete, (2) potassium, (3) calcium, (4) magnesium, (5) iron, (6) nitrogen, (7) sulfur, (8) manganese, (9) phosphorus.

Corn responds to applications of muriate of potash in Henderson County, North Carolina. F. R. Farnham, Dairy Extension Specialist at State College, and County Agent G. D. White are examining corn grown on one of the county's successful dairy farms.

Potash Enters the Dairy Business

By F. H. Jeter

North Carolina State College of Agriculture, Raleigh, North Carolina

UP IN the mountain country of western North Carolina, where farms are relatively small and where there is not so much good land available for row crops, every acre must yield well or the owner finds himself in distress. Corn has always been a staple crop in this section and is growing in importance as the mountain landowners are turning to dairying and poultry raising.

Fresh milk, poultry, and eggs are needed for the great number of tourists who visit this land in summer and early fall. Then, too, a profitable local market is developing for milk to be manufactured into ice-cream mix, butter, and semi-solid buttermilk. In the past few months, farmers in six of the mountain counties adjacent to Asheville have captured for themselves a $200,000 business of supplying milk to the famous Biltmore Dairy. Formerly the dairy bought this milk from outside of the state. E. D. Mitchell, manager of the dairy, told me recently that his business was expanding, that he would need more milk for manufacturing purposes, and that he was preparing for any increased volume that might be offered him by the farmers of the section.

These men so far have from 2 to about 15 cows, and the milk is gathered daily by trucks coming from the milk plants, or it is assembled at central points where refrigerating plants have been installed. Other farmers

produce Grade "A" milk for direct retail distribution.

All of which is by way of saying that more corn is needed. And since the acreage of lush, reek lowlands is limited, the acres must be made to produce more. It seems that white corn will grow fairly well in these valleys, even though it responds readily to a more progressive method of fertilizing than has been followed in the past; but yellow corn seems to be light and nubby. Yet yellow corn is fine for poultry and cows. The corn contains the "something extra" usually called vitamins by those scientifically informed.

A. B. Corpening, of Horse Shoe, Henderson County, planted 5 acres of Jarvis Golden yellow corn in his creek bottoms this spring, fertilizing it with 200 pounds of an 0-10-4 mixture to the acre. One acre of this corn he top-dressed with 100 pounds of muriate of potash, when the corn was about knee high. Mr. Corpening had not harvested his corn when I visited the field on October 4, and it was too late in the evening to make a picture, but there was a decided difference in both growth and ear. F. R. Farnham, dairy extension specialist at State College, and G. D. White, county agent of Henderson County, examined the corn and estimated that where the land had received the application of muriate, the corn was 50 per cent better than where no such application was made.

Convincing Response

Where no potash was applied, the ears were light and chaffy, and the growth was poor. The stalks had a tendency to lean over, and many were broken. Four rows away from this check plot, Mr. Corpening had planted the remainder of his field in Lance's Prolific white corn, a local variety, and he had some of the muriate left over, so he tried it on a few rows of this corn. Again was the same striking difference noted.

(*Turn to page* 46)

Corn demonstration on the farm of C. F. Ward, Hendersonville, North Carolina. The whole plot was fertilized with 200 pounds of an 0-10-4 per acre at planting and side-dressed with 100 pounds of nitrate of soda. In addition, the corn on the left from the stake back received 100 pounds of muriate of potash.

We Met the Change In Burley Tobacco

By H. G. Kolb
County Agent, Switzerland County, Indiana

DURING the past 10 years the increased consumption of cigarettes has made a great change in the type of burley tobacco desired by the manufacturers who buy the crop. Formerly the darker, heavier grades of burley brought the best prices. Now it is the thinner, brighter, and lighter colored crops that bring the highest prices. To meet this situation, the burley tobacco raisers of Switzerland County, Indiana, have changed their tobacco-growing methods so successfully that their tobacco is noted for its quality and the high prices that it brings on the market.

Burley tobacco is the chief cash crop in Switzerland County, being raised on more than 80 per cent of the farms. Normally, more than 3,000 acres are planted to tobacco, and more than 3,000,000 pounds of leaf are sold on the near-by loose-leaf markets. The comparative size of the crop raised is best shown by the fact that Switzerland County produces more than 1 per cent of the burley crop grown in the United States, even though 400 counties raise this type of tobacco and there are only four smaller counties in Indiana.

In the past 10 years good growers in the county have made much progress in producing the quality that tops the market. One helpful change is the use of seed of various strains of improved white burley. Another change is the increased number of plants set per acre in the past few years. The best growers now set 12,000 or more plants per acre, where they formerly set 7,000 plants. Recently there has been a change in methods of handling the crop. Topping is delayed, and the suckers are removed just a day or two before cutting. Besides improving the quality, this latter item has also reduced labor costs.

These changes have all been helpful, but the greatest improvement has been brought about by the special fertilizer used by a majority of the successful burley growers of Switzerland County. To better meet our local conditions, these growers have used a sack of 2-12-6 mixed fertilizer supplemented with 50 to 60 pounds of sulphate of potash and 25 pounds of nitrate of soda. This mixture is drilled in the row, usually at the rate of 200 pounds per acre.

Content is Important

Some growers have used as little as 100 pounds per acre of this mixture, and others as much as 500 pounds. The desired quality is produced by the smaller amount, and increased yields per acre are obtained by the larger application in favorable years. Over a period of years, an application of about 200 pounds per acre has shown the largest returns per dollar of investment for fertilizer. The important item seems to be using the proportions and the ingredients listed above.

Most farmers who use this special

mixture also use from moderate to heavy applications of stable manure on their old ground that is set to tobacco. However, excellent results have been obtained where this fertilizer mixture has been used alone on old ground. Equally good results have been obtained on all kinds of soil—river bottom, creek bottom, limestone ridge land, and flat slash land—and Switzerland County has 26 distinct soil types, most of which are subdivided into leached or eroded phases.

Chlorosis or mottling, indicating potash starvation, begins at the tip of the older leaves.

Variable Factors

No exact tabulated results, such as an experiment station would have, have been made by the writer. A county agent has neither the time nor facilities to obtain such figures, and tobacco is a difficult crop on which to obtain exact figures. Weather at cutting and curing time may cause considerable variation in quality. It is a very difficult task to handle two or three or more plots of tobacco under exactly the same conditions, so that comparable results can be obtained. For these reasons, data on the results of the use of this special fertilizer mixture in Switzerland County can only be given in terms of returns per acre.

Some figures follow: Clair Shaw, a 4-H Club boy, sold $240 worth of tobacco from a measured one-fourth acre of land in 1936, raising his crop on ridge land. James Green received $1,400 from tobacco grown on 2 acres of creek bottom land. In December of last year, the writer saw seven Switzerland County crops sell on the Carrollton, Kentucky, loose-leaf market in one day. These crops averaged from 51 to 70 cents per pound, while the floor average for all crops was below 40 cents a pound for the day. Similar figures could be quoted for hundreds of crops.

Good tobacco raisers state that they have used this fertilizer mixture and produced on old land tobacco equal in quality to new ground tobacco, with about twice the number of pounds per acre. In 1936 Dick McKenzie had 1.5 acres of new ground that made 450 pounds per acre and sold for 58 cents. He also had 1.5 acres of old ridge land, on which he applied 200 pounds of this fertilizer

per acre, which produced 900 pounds per acre, selling for 65 cents per pound.

The ability of this fertilizer to produce a quality of tobacco equal to that grown on new ground is of considerable importance nowadays. The amount of new ground suitable for tobacco production is very limited.

A properly balanced fertilizer makes burley tobacco leaves smooth and of fine texture.

If the quality of tobacco that the market demands is to be produced, this fertilizer or some similar one that is equally effective must be used.

Profitable Results

Switzerland County burley growers do not claim that this special mixture is the best possible, nor do they know exactly why it works. They do know that it is inexpensive to use and that it produces results that are almost unbelievable when the resultant crops of burley are sold and the returns per acre calculated. They know that it has added from $50 per acre to the sale value of their tobacco in low-price years, to as high as $300 per acre in high-price years. The use of this fertilizer has spread in recent years to adjoining counties in Indiana and Kentucky, with equally good results.

The 2-12-6 fertilizer is used as the base for this fertilizer, because it is a standard brand easily obtained, provides the needed phosphorus, and contains potash in the muriate form. Muriate of potash alone produces a poor quality of leaf, but when it does not make up more than one-third of the potash applied, it adds weight and finish to the crop, without harming the quality. Sulphate of potash is used to provide the remainder of the potash needed, as it produces the thin, light-colored leaf that buyers want. Used alone, sulphate of potash produces leaf lacking in finish and weight. Growers find that a mixture of one-third or less of muriate of potash with two-thirds or more of sulphate of potash produces burley that sells the highest.

The 25 pounds of nitrate of soda are used merely to give the transplanted crop a quick start. Usually growers transplant in cool, wet weather, when soil nitrification is poor. The application of this small

(*Turn to page* 42)

Easy picking for these workers—larger, more accessible bolls resulted from proper fertilization.

1937—A Cotton Year Of High Records

C. B. Sherman

United States Department of Agriculture, Washington, D. C.

THIS is a year of extremes in the cotton crop of the United States. The crop will reach a record total—18,243,000 bales being forecast by the Crop Reporting Board of the Bureau of Agricultural Economics. This forecast is larger by nearly 2,700,000 bales than the one published in August, for weather conditions were unusually favorable after that date, and the boll-weevils have not been so destructive as usual. It will be the largest cotton crop in our history, the previous record having been made in 1926. In round numbers this year's crop compares with 12,400,000 bales in 1936 and 10,600,000 bales in 1935. The 5-year average (1928-32) was 14,667,000 bales.

The estimated abandonment of cotton acreages is one of the lowest on record. It will probably total only a little more than 1 per cent, leaving nearly 33,750,000 acres for harvesting.

Yield is chalking up another record. This year's indicated yield of 258.8 pounds per acre for the United States has never before been reached. Last year the yield averaged 197.6 pounds. There is some evidence that the average per-acre yield is steadily increas-

ing in the United States, but statistics are not yet sufficient to justify a positive statement.

For the year 1936-37 as a whole, a new all-time high consumption of cotton in the United States is recorded, exceeding the 5-year average by more than one-third. World mill consumption also reached a new high of 31,000,000 bales.

Consumption of American cotton in foreign countries dropped to a near-record figure for recent decades. It was about 5,400,000 bales. Exports of United States cotton in these 12 months were about the same as foreign consumption, 5,400,000 bales—9 per cent less than a year earlier. Cotton mills in the United States consumed 7,800,000 bales of American cotton during these 12 months. The year before they consumed 6,200,000 bales.

The proportion of the cotton crop exported has been between 50 and 60 per cent during recent years. The decrease in cotton exports during the last 5 years has been caused by (1) the low level of general business conditions during most of this period, (2) reduced buying power in foreign countries, (3) smaller supplies of American cotton and higher prices relative to prices of foreign cotton, and (4) an increase in foreign production.

Stocks of old American cotton in the world on August 1 totaled 6,000,000 bales, compared with 7,000,000 a year earlier. Thus the total supply of American cotton for the current marketing season, according to present indications, will exceed 24,000,000 bales. Last year the total supply was 19,400,000 bales.

Improvement in the quality of cotton produced and in the marketing methods is an objective toward which the U. S. Department of Agriculture is consistently driving. Basic to success is precise knowledge of just what constitutes quality in cotton. Therefore, this question itself is being studied in the laboratories with meticulous precision.

The staple length of the American cotton crop has improved during the course of the last 9 years. Staple length can be measured accurately and official grade and staple reports, not published for the nine crops of 1928 to 1936, show an appreciable increase in the average length of staple since the date of the first report.

Change in Quality

Before that date it was commonly believed that the quality of our cotton crop had been deteriorating, particularly after the boll-weevil got to work. Even before, manufacturers had complained of a serious depreciation in the quality of cotton grown in Louisiana and Mississippi. How well these beliefs were justified can never be definitely known, but an accurate determination of these factors of quality for the cotton crops since the reports began is now possible. The reports show the number of bales in each individual grade and in each staple-length group, so an account can be given from either standpoint.

(*Turn to page* 44)

Bringing in cotton to be weighed.

Crotalaria Is Good For Southern Soils

By E. B. Ferris

Superintendent, Holly Springs Branch Experiment Station, Holly Springs, Mississippi

ONE of the main troubles with summer legumes, such as cowpeas, soybeans, velvet beans, and lespedeza when used as soil builders, is that they are so valuable as feed crops that the average grower cuts them for hay or grazes them with livestock rather than turn them into the soil. In so doing he removes from 80 to 90 per cent of their restorative properties, unless said crops are fed to animals and the manure returned to the soil, a procedure seldom carried out in ordinary farm practice. Even when such crops are grown and not cut for hay, animals turned into the fields during fall and winter, half starved as they frequently become, finally consume the most of such vegetation, leaving little to be plowed into the soil the following spring. This is why so much more progress is being made in the South in soil building with winter rather than with summer legumes. Winter legumes grow at a time when the farmer has not been accustomed to receive a revenue from his land, and are much more apt to be turned into the soil without being cut as hay or used for grazing animals.

A new crop recently introduced into the South as a summer legume has the best possibilities for soil building of any we have seen. This crop is crotalaria and not only has the advantage of making enormous yields

A field of Late Crotalaria Spectabilis growing at the Holly Springs Experiment Station. This variety makes the heaviest growth, but does not always mature seed as far north as the Tennessee line.

of vegetable matter on the poorest soils, but of being unpalatable to all kinds of livestock, so that the farmer will not attempt to save it as hay nor the animals to consume it when given the run of the fields in fall and winter. In 1936, as agronomist for the Mississippi Extension Service, the writer placed tests with crotalaria, sesbane, and soybeans with farmers in 36 Mississippi counties extending from the Gulf Coast to the Tennessee line and kept records of green weights produced the following fall. This resulted in 50 per cent higher average yields of crotalaria than of soybeans, with the beans giving considerably higher yields than the sesbane. Visits to certain of these tests the following winter showed that animals having access to them had largely consumed the soybeans, even after frost had killed the vines and they were seemingly worthless as feed, there being no limit to the length a hungry animal will go in eating any kind of crop that was ever palatable. However, in no instance had they ventured to disturb the crotalaria or sesbane.

Showing crotalaria sown in the same drill with corn. Its habit of starting active growth late makes it a less serious competitor for moisture with the corn than soybeans similarly grown.

Results of Comparison

In tests begun in 1933 at the Holly Springs Branch Experiment Station, crotalaria has been planted on the same plots in three ways: in alternate years with corn; every year in the same drill with corn; and annually in corn middles at lay-by time. It has been compared with soybeans grown in the same way, except these beans have not been planted alone in the test.

It may be interesting to note the results of such a test in 1937, when the seasons were dry and when the vegetable matter and nitrogen stored in the soil by the crotalaria turned under the year before had a very marked effect. Corn following corn made only 8.9 bushels per acre; corn following crotalaria 23.2 bushels per acre; corn with crotalaria in drill, 12.4 bushels per acre; corn with crotalaria in middles, 9.5 bushels; corn with soybeans planted in the same drill and at the same time, 11.1 bushels per acre; and corn with soybeans planted in the middles at last cultivation, 11.0 bushels. All these plats were fertilized annually at the rate of 400 pounds of a 2-8-4 mixture per acre. In fact, in studying hundreds of tests with soil-building crops at the Holly Springs Station, no treatment has shown such marked beneficial results as the ones following the use of crotalaria. Even when planted in the drill and at the same time with corn, it grows off so much slower than soybeans that it is never a serious competitor for moisture with the corn and does not lower corn yields as is so often the case with soybeans, especially in dry years. As a matter of fact, the delicacy of the young crotalaria plants and the slowness with which they start growing after germination are the greatest objections to the crop, especially on land infested with weeds or grasses, and on such land make it all but imperative that the crop be planted in

drills and given some early cultivation. However, it has many of the characteristics of the proverbial mustard seed and will soon attain a height and strength where the birds may roost in its branches.

While there are as many varieties of crotalaria as of other common farm crops, only a few kinds are grown in Mississippi. Early Spectabilis, Late Spectabilis, and Intermedia are the ones generally used. Both Early and Late Spectabilis have been tried at Holly Springs, with the Early making much less vegetation but seeding freely before frost, and the Late being far more valuable for adding vegetable matter but frequently blooming so late as to make seed production uncertain. To date, it is the opinion at the Holly Springs Station that it is more economical to buy seed of the Late Spectabilis every year than to use the Early and be more certain of producing one's own planting seed, the difference between the soil-building properties of the two kinds making this advisable.

For Reseeding Purposes

Farther south in Mississippi, Holly Springs being within 15 miles of the Tennessee line, the Late Spectabilis might be planted earlier and be expected to reseed with more certainty. However, as far south as Poplarville, 50 miles from the Gulf Coast, the South Mississippi Experiment Station uses Early Spectabilis mainly because of its ability to make seed. They even find this early kind valuable as a catch crop in cotton, germinating as it does after the cotton is laid by and in time to make seed. The seed lie dormant for months and germinate again the following spring and summer in sufficient quantities to leave a stand up to the last cultivation, even after much of it has been destroyed in plowing.

The South Mississippi Experiment Station reports in 1937 the following comparative effects of crotalaria, lespedeza, and a 6-8-4 fertilizer as measured by cotton; after crotalaria, 904 pounds of seed cotton per acre; after lespedeza, 824 pounds per acre; after 600 pounds of 6-8-4, 660 pounds per acre. The cotton following crotalaria and lespedeza had been fertilized at the rate of 600 pounds of an 0-8-4 per acre.

Need Plant Food

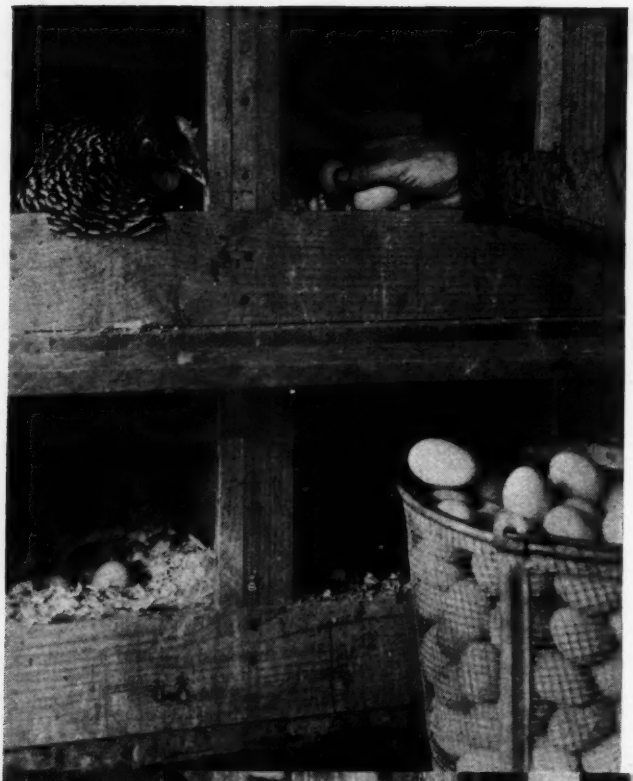
While crotalaria will make more vegetation on poor soils than any other crop of the kind within our knowledge, it has no power to get mineral plant foods except as they are present in the soil naturally or added in the form of fertilizers. In the work done in the 36 Mississippi counties referred to above, the three legumes, crotalaria, sesbane, and soybeans, were grown with and without the use of mineral plant foods. Their increased yields with these minerals added were seemingly in the same proportion to be expected from the non-legumes, such as cotton or corn, after the necessary nitrogen had been supplied.

Twenty to thirty thousand pounds of green matter per acre are not an uncommon yield for crotalaria, and when this amount of vegetation is finally turned into the soil it will not only add in nitrogen the equivalent of hundreds of pounds of nitrate of soda or sulphate of ammonia, but at the same time sufficient humus to come nearer putting the soil back into its once virgin state than any other operation, possible of accomplishment in a few years, that we know anything about.

Crotalaria seed are very hard and germinate poorly without first being scarified. While cowpeas, peanuts, and velvet beans previously grown on the land will inoculate for crotalaria, complete inoculation is so important and so cheaply done with commercial cultures that it is doubtful if it pays to plant any of the newer legumes anywhere or at any time without first inoculating the seed.

PICTORIAL

LOOK OUT—BELOW!

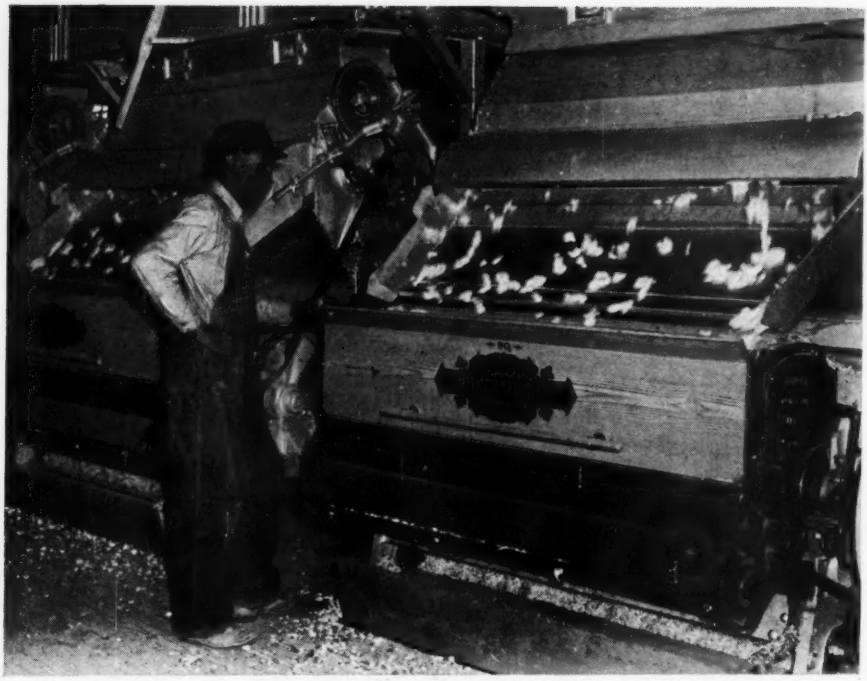


Left: "Wait a minute, can't you?

Below: One of the first families of America.

Above: Let your conscience be your guide.

Right: Caught for the axe.



Cotton running in the gin, corn a'filling up the bin—you'd smile too!

The Editors Talk

Plant-food Erosion

During the past few years an unusual amount of publicity has been given to soil erosion, and rightly so. It is to be hoped that there will be no let-up in the efforts to awaken public consciousness to the dangers of letting our soils go to waste. When pointed out, stark gullies, denuded hills, and wind-swept plains are mute but very visible evidence of these dangers and serve to impress even the less-thinking. Full cooperation with the endeavors of the Soil Conservation Service and H. H. Bennett, its tireless chief, should be the aim of everyone concerned with the welfare of our country.

Not so visible, in fact, invisible, is the additional, important, but less understood danger of plant-food erosion. It is gratifying to find no less eminent a soil scientist than Dr. J. G. Lipman talking before a recent meeting of farmers in New Jersey and emphasizing the fact that soluble plant nutrients are disappearing unobserved from the farmer's soil. Chemical erosion was referred to as the invisible thief in the mystery of America's vanishing soil fertility.

"Dissolved in rainwater, the natural and artificially applied lime, potash, sodium, and magnesium are vanishing in two directions," Dr. Lipman said. "Part of the solution runs off the land laterally in the same erosive waters that cause gullying and sheet washing. Another part leaches down through the soil, carrying the desirable materials to lower levels where they are unavailable for plants to feed upon. When we see muddy water, carrying off particles of the farmer's soil, we say 'that's erosion.' And we can also see dust storms—wind erosion. But the naked eye does not see the agricultural wealth which is dissolved."

The "chemical erosion" problem is common to the entire Northeast and to the Mississippi Valley, Dr. Lipman explained, because of the large amount of rainfall. It is particularly acute in fruit-growing sections where a toxic condition of acid soil causes "sick" apple and peach trees. There is an annual net deficit of 60,000,000 tons of lime alone, he estimated, and large losses of other necessary elements of plant food result from chemical erosion.

In a bulletin on the subject entitled "Preliminary Note on the Inventory and Balance Sheet of Plant Nutrients in the United States," Dr. Lipman calls attention to the fact that American agriculture started with vast soil fertility resources. These resources are still vast, but in the course of time there have been tremendous deductions from the original inventory of our plant-nutrient resources. If we are to look ahead and to make provision for maintaining our soils at a satisfactory level of productivity, we not only must know about our soil resources but should also familiarize ourselves with the rate of soil depletion.

Measures which will assure some means of effective conservation and lessening of the drain on plant-food resources should be promptly taken. Changed methods of soil management, which would include proper provision for lessening the losses due to erosion and leaching, would represent a major conservation measure. Such changes in soil and crop management systems as would permit a lessening in the runoff, an increase in the amount of water stored in the soil, and an increase in the area occupied by legumes are other suggestions made.

Along with the educational work on the efficient use of commercial plant foods there should be more emphasis on the causes and measures of control of plant-food erosion. Plant foods applied cannot result in maximum benefits unless they remain in proximity and available to the growing plants.

The Value of A Reputation

The innumerable advantages accruing from obtaining and maintaining a reputation as a grower of quality produce are so well-known that it becomes almost trite to mention them. However, there continually come to hand instances which bear repeating because of the inspiration and help they may provide other growers.

Such an instance is that of the potato growing of Louis Ruderman, of Auburn, Indiana. At the Northern Indiana Muck Crops Show recently held at Kendallville, Indiana, Mr. Ruderman exhibited a sack of Katahdin potatoes which was judged the best commercial pack at the show. This was not the start of Mr. Ruderman's reputation. Last year he topped the market at Chicago with his car-load lot of potatoes. Because his produce has become known, this year buyers came direct to the farm and purchased his potatoes as fast as they could be dug and crated. He uses a brush machine to clean the potatoes before they are marketed and has found that the trade is willing to pay a 30 per cent premium for his crop.

We do not know all the details of Mr. Ruderman's cultural practices, but we would gamble that he does not neglect any factor that might jeopardize his reputation as a grower of quality produce. We do know his fertilizer practices, which indicate an intelligent study of the importance of balancing the plant food applied with the fertility of his soil and the requirements of his crop.

In years of high yields and the resultant price competition on crowded markets, the reputation for growing quality produce may very often mean the price difference and trade preference which determine profit or loss on a whole year's work.

MY GARDEN is an honest place. Every tree and every vine are incapable of concealment, and tell after two or three months exactly what sort of treatment they have had. The sower may make a mistake and sow his peas crookedly; the peas make no mistake, but come up and show his line.—*Ralph Waldo Emerson.*

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Fertilizers, Soils, Crops, and Economics. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

J.Y.Oakes summarizes many informative facts resulting from investigations on the role of potash in the fertilization of cotton under field conditions in Louisiana Agricultural Experiment Station Bulletin 291, entitled "The Effects of Potash Fertilizer on Cotton in Louisiana." Previous work in Louisiana showed that the Coastal Prairie soils and the lighter textured Coastal Plain soils respond markedly to applications of potash in a balanced fertilizer mixture. The nature of these tests was designed to determine the most economical amount of potash to apply to cotton on a number of soil types of the state. Soils in the northern part of the state are subject to severe drouths followed by heavy rainfalls that result in leaching and severe erosion, thus causing heavy losses of plant-food elements. The large amounts of rainfall occurring in the southern part of the state throughout the year, while causing little erosion owing to the level topography of the soil, result in a considerable amount of plant food being lost through leaching. These lighter soils are in greater need for potash than some of the heavier or more recently formed alluvial soils. Results on one of the predominating soils in the Coastal Plain red hills area indicated that even under unfavorable conditions 6 per cent potash in a mixture with 5 per cent nitrogen and 8 per cent phosphoric acid used at the rate of 600 pounds per acre was the most desirable. The Ruston soils of the Coastal Plain hill areas gave highest cotton yields from 8 per cent potash. Cotton grown on many of the soils in the Coastal Prairie region respond to applications of from 6 to 10 per cent potash. In the rice-producing section, soils spoken of by farmers as sandy ridge land are very responsive to phosphorus and potassium, and at least 12 per cent potash for cotton could be recommended on such soils for the first few years. Generally speaking, the results indicate that a balanced fertilizer mixture containing 6 or 8 per cent potash should be used where potash starvation occurs. The author states that the control of cotton "rust" and wilt through the use of potash fertilizers seemed in nearly all cases to be correlated with or coincident to stimulation of vegetative growth and increased yield of seed cotton. The length of lint and percentage of fiber are also increased where starvation conditions are corrected by applications of potash.

"Fertilizer and Crop Experiments on Certain Soils of the Black Belt," (A Progress Report), Agr. Exp. Sta., Auburn, Ala., Cir. 78, July 1937, M. J. Funchess, Director.

"Fertilizer Experiments with Cotton in Type-of-Farming Areas," Agr. Exp. Sta., Fayetteville, Ark., Bul. 346, June 1937, Martin Nelson.

"The Response of Celery to Manures and Fertilizers," Agr. Exp. Sta., Kingston, R. I., Bul. 260, Mar. 1937, F. K. Crandall.

"Machine Placement of Fertilizer for Cotton," Agr. Exp. Sta., College Station, Brazos County, Texas, Bul. 548, August 1937, H. P. Smith, H. F. Morris, and M. H. Byrom.

Soils

The striking results obtained from the soil fertility experiments carried on at the Moses Fell Annex Farm at Bedford, Indiana, under the direction of A. T. Wiancko and G. P. Walker of the Agronomy Department, Purdue Agricultural Experiment Station, are given in a recent mimeographed report. Farmers in southern Indiana especially will derive a great deal of value from this work. It is evident that the spread between the good and poor soil treatments is becoming greater year by year and that the better treatments are becoming more and more profitable. Without soil treatment, the average value of crops per acre per rotation of corn, soybeans, wheat, and clover is now $24.51. With lime, manure, and fertilizer, the value is $71.91 at an average cash outlay of $10.06 for lime and fertilizer. Formerly the main fertilizer treatments that returned appreciable profits consisted of superphosphate, either alone or in addition to manure. In recent years, however, potash has become increasingly important on the land which had been receiving only phosphate, showing that the available supply of potash has been so reduced that it has become a limiting factor. It is showing up particularly on the corn and hay. Among the experimental results compiled in tabular form and briefly discussed are the general fertility test, top-dressing wheat with nitrogen in the spring, phosphate experiment, crops variety tests, pasture fertilization, and crop rotation experiments.

"A Study of the Operation of the 1936 Soil Conservation Program in Vermont," Bulletin 413 of the Vermont Agricultural Experiment Station, by J. A. Hitchcock, gives a concise interpretation of data compiled by several cooperating agencies in determining the effects of farm conservation practices due to the 1936 program. It was found from these data obtained from nine Vermont towns that participation of the 1936 soil conservation program was more general among the operators of large farms, among operators who were handling their farms intensively, and among Farm Bureau members. Participants who filled out conservation program work sheets applied 43 per cent more commercial fertilizer in 1936 than they did in 1935, whereas non-participants in the program increased their fertilizer purchases between the two years by only 21 per cent. Similarly the program was responsible for an appreciable increase in acreage stocked down.

Though entitled "AAA Conservation Guide for Women, Western Region 1937," WR-Leaflet 104 of the Regional Information Series, United States Department of Agriculture, will be found very interesting to Mr. Farmer as well. This publication is profusely illustrated with a number of farming scenes, usually with a scenic background typical of the mountain, valley, or desert sections. They show the good and bad effects upon the land resulting from the manner in which erosion control had been practiced. This leaflet contains a minimum of text material, but the brief definitions and outline of the essential information about the farm and range programs are simply explained. The cropping and other practices of the 1937 agricultural conservation program in the Western Region described and illustrated in this publication will help to make any farm or ranch a more productive and profitabe unit through the years to come.

"Studies on Soil Structure: Some Physical Characteristics of Puddled Soils," Agr. Exp. Sta., Tucson, Ariz., Tech. Bul. 67, June 15, 1937, W. T. McGeorge.

"Studies on Soil Structure: Some Nitrogen Transformations in Puddled Soils," Agr. Exp. Sta., Tucson, Ariz., Tech. Bul. 69, August 15, 1937, J. F. Breazeale and W. T. McGeorge.

"Washington County Soils," Agr. Exp. Sta., Urbana, Ill., Soil Rp. 58, June 1937, R. S. Smith and L. H. Smith.

"Marshall County Soils," Agr. Exp. Sta., Urbana, Ill., Soil Rp. 59, June 1937, Eric Winters, Jr., R. S. Smith, and L. H. Smith.

"Putnam County Soils," Agr. Exp. Sta., Urbana, Ill., Soil Rp. 60, July 1937, Herman Wascher, R. S. Smith, and L. H. Smith.

"Wabash County Soils," Agr. Exp. Sta., Urbana, Ill., Soil Rp. 61, July 1937, R. S. Smith and L. H. Smith.

"The Occurrence of Azotobacter in Iowa Soils and Factors Affecting Their Distribution," Agr. Exp. Sta., Ames, Iowa, Res. Bul. 217, June 1937, William P. Martin, R. H. Walker, and P. E. Brown.

"Soils in Relation to Fruit Growing in New York, Part XI. The Organic-Matter Content of New York Orchard Soils in Relation to Orchard Performance," Cornell Univ. Agr. Exp. Sta., Ithaca, N. Y., Bul. 672, June 1937, Ralph W. Cummings.

"The Ground-Water Problem in Oregon," Agr. Exp. Sta., Corvallis, Oregon, Sta. Cir. 124, June 1937.

"Irrigation Requirements of Cotton and Grain Sorghum in the Wichita Valley of Texas," Agr. Exp. Sta., College Station, Brazos County, Tex., Bul. 543, Aug. 1937, C. W. McDowell.

"Some Moisture Relations of the Soils from the Erosion Experiment Stations," U. S. D. A., Washington, D. C., Tech. Bul. 562, July 1937, L. B. Olmstead.

"Soil Survey of Dubois County, Indiana," U. S. D. A., Washington, D. C., Series 1930, No. 45, March 1937, C. S. Simmons, R. T. Avon Burke, T. M. Bushnell, J. E. Adams, and H. P. Ulrich.

"Soils Survey of Brunswick County, North Carolina," U. S. D. A., Washington, D. C., Series 1932, No. 17, Feb. 1937, S. O. Perkins and E. F. Goldston.

"Soil Survey of Abbeville County, South Carolina," U. S. D. A., Washington, D. C., Series 1932, No. 18, March 1937, F. R. Lesh, W. J. Geib, A. E. Shearin, C. H. Wonser, and W. D. Lee.

"Soil Survey of Mayes County, Oklahoma," U. S. D. A., Washington, D. C., Series 1932, No. 19, March 1937, M. H. Layton and O. H. Brensing.

Crops

"A Year's Progress in Solving Farm Problems of Illinois" is the descriptive title of the Illinois Agricultural Experiment Station Annual Report of Director H. W. Mumford for 1935-1936. Considerable attention to the review of accomplishments on soil conservation and erosion prevention is given in this report along with a volume of other scientific facts emanating from the station's investigations. Even before 1876 the problems of soil conservation and erosion prevention were recognized, and the attack in this state took definite form that year with the laying out of the Morrow plots, now recognized as America's oldest soil experiment plots. Director Mumford looks back 60 or 75 years when farmers of Illinois believed their rich prairie soils would never wear out. This report represents the 60th year in which the problems of soil mining and destruction have been attacked by the College of Agriculture, and in it are given the results not only from the Morrow plots and numerous experimental fields, but also from some 30 other experiments and studies which have a more or less direct bearing upon the problems of soil conservation and erosion control.

Field experiments in Illinois indicate that responses to various soil-treatment materials are related to the productivity levels of the soils. If farm lands of this state are to be conserved and improved, deficiencies of essential material must be replenished by means of suitable practices, the report stresses. Among the deficiencies that may need attention under general conditions are organic matter, lime, phosphorus, and potassium. When these deficiencies are made up, better responses are obtained, not perhaps from the mineral or minerals alone but through better functioning of the organic matter. Recent results secured in southern Illinois indicate that the repeated growing of sweet clover, with accompanying increase of other crops, removes large amounts of potassium from the soil. When available potassium is present naturally in limited amounts, increased crop yields can be secured only by supplying potassium in the form of straw, manure, or through potash fertilizers. This work reveals that sweet clover does not unlock suf-

ficient available potassium to meet the needs of ordinary crops on most soils and that instead of sweet clover increasing the usefulness of soil potash, potash fertilization has increased the value of sweet clover for soil improvement.

The constructive activities pursued by this station are doubtless pointing the way for Illinois farmers, and the success of the soil conservation measures set down will be borne out through the years to come.

"The Natural Vegetation of Arizona," Agr. Exp. Sta., Tucson, Ariz., Tech. Bul. 68, July 15, 1937, A. A. Nichol.

"Growth of Second-Growth Pine on the Coastal Plain Soils of Arkansas," Agr. Exp. Sta., Fayetteville, Ark., Bul. 342, June 1937, Lewis M. Turner.

"Variety and Inter-Cultural Experiment with Cowpeas," Agr. Exp. Sta., Fayetteville, Ark., Bul. 343, June 1937, C. K. McClelland,

"Cotton Variety Tests of 1934 and 1935," Agr. Exp. Sta., Fayetteville, Ark., Bul. 344, June 1937, L. M. Humphrey.

"Growth and Fruiting Responses to Pruning and Defloration of Tomato Plants," Agr. Exp. Sta., Fayetteville, Ark., Bul. 347, June 1937, Victor M. Watts.

"A Study of Factors Concerned with Rice Growth," Agr. Exp. Sta., Fayetteville, Ark., Bul. 349, June 1937, L. C. Kapp.

"Control of Root-Knot in Florida," Agr. Exp. Sta., Gainesville, Fla., Bul. 311, July 1937, J. R. Watson and C. C. Goff.

"Inheritance of Rest Period of Seeds and Certain Other Characters in the Peanut," Agr. Exp. Sta., Gainesville, Fla., Tech. Bul. 314, Sept. 1937, Fred H. Hull.

"Composition of Mature Corn Stover as Affected by Variety, Soil Type, and Fertilizer Treatment," Agr. Exp. Sta., Urbana, Ill., Bul. 437, July 1937, D. C. Wimer.

"Eighth Biennial Report of the Director for the Biennium July 1, 1934, to June 30, 1936," Agr. Exp. Sta., Manhattan, Kans., L. E. Call, Director.

"Forest Industrial Expansion in Southeast Texas—Possibilities and Dangers," Southern Forest Exp. Sta., New Orleans, La., Oc. Paper 66, August 9, 1937, Robert K. Winters.

"Tomato Production in Massachusetts," Agr. Ext. Serv., Amherst, Mass., Leaf. 51, May 1937, Grant B. Snyder and Paul W. Dempsey.

"Winter Wheat Culture in Michigan," Agr. Ext. Serv., East Lansing, Mich., Ext. Bul. 187, Sept. 1937, H. M. Brown and E. E. Down.

"Garden Roses," Agr. Exp. Sta., East Lansing, Mich., Sp. Bul. 222, (Revised), Mar. 1937, C. E. Wildon.

"Science Points the Way. Work of the Agricultural Experiment Station During the Year Ending June 30, 1936," Agr. Exp. Sta., Columbia, Mo., Bul. 387, July 1937, F. B. Mumford and S. B. Shirky.

"Trees, Shrubs, and Vines at the North Platte Experimental Substation," Agr. Exp. Sta., Lincoln, Nebr., Bul. 310, July 1937, H. A. McComb.

"The Inheritance of Various Morphological Characters in Alfalfa and Their Relation to Plant Yields in New Jersey," Agr. Exp. Sta., New Brunswick, N. J., Bul. 628, May 1937, Glenn W. Burton.

"Soybeans for Grain," Agr. Exp. Sta., New Brunswick, N. J., Cir. 373, July 1937, Howard B. Sprague.

"Sugar-beet Production Studies in Southern New Mexico 1931-1936," Agr. Exp. Sta., State College, N. Mex., Bul. 252, July 1937, John C. Overpeck, Harry A. Elcock, William B. Morrow, and Rufus Stroud.

"Incidence of Fire Blight in Young Apple Trees in Relation to Orchard Practices," Cornell Univ. Agr. Exp. Sta., Ithaca, N. Y., Mem. 203, May 1937, E. M. Hildebrand and A. J. Heinicke.

"Fifty-seventh Annual Report of the North Carolina Agricultural Experiment Station for the Fiscal Year Ending June 30, 1934. Progress Report for Year Ending December 1, 1934," Agr. Exp. Sta., Raleigh, N. C., R. Y. Winters, Director.

"The Comparative Values of Peanut and Soybean Hay for Milk Production," Agr. Exp. Sta., Raleigh, N. C., Bul. 312, Aug. 1937, C. D. Grinnells and J. L. Moore.

"The Panhandle Bulletin, Fertility Losses from High Plains Soils Due to Wind Erosion," Agr. Exp. Sta., Goodwell, Okla., No. 63, Sept. 1937, Wright H. Langham.

"Forty-ninth Annual Report, Rhode Island State College Agricultural Experiment Station," Kingston, R. I., Contb. 503, June 1937, Basil E. Gilbert.

"Twenty-one Years of Crop Yields from Cottonwood Experiment Farm," Brookings, S. Dak., Bul. 312, May 1937, A. N. Hume, Edgar Joy, and Clifford Franzke.

"A Study of Utah's Winter Range, Composition of Forage Plants and Use of Supplements," Agr. Exp. Sta., Logan, Utah, Bul. 277, June 1937, A. C. Esplin, J. E. Greaves, and L. A. Stoddart.

"Should Flax Be Grown in Utah," Agr. Exp. Sta., Logan, Utah, Bul. 278, July 1937, R. W. Woodward, D. C. Tingey, and A. C. Dillman.

"The Grazing of Maple Sugar Orchards," Agr. Exp. Sta., Burlington, Vt., Bul 414, Mar. 1937, J. A. Hitchcock.

"Fiftieth Annual Report 1936-1937," Agr. Exp. Sta., Burlington, Vt., Bul. 425, July 1937, J. L. Hills, Director.

"Department of Agriculture-Immigration of Virginia," Richmond, Va., Bul. 353, Oct. 1937.
"Production of Carrots," U. S. D. A., Washington, D. C., Leaf. 125, J. H. Beattie.
"The Culture of Table Beets," U. S. D. A., Washington, D. C., Leaf. 127, J. H. Beattie.
"Production of Spinach," U. S. D. A., Washington, D. C., Leaf. 128, J. H. Beattie.
"Production and Preparation of Horseradish," U. S. D. A., Washington, D. C., Leaf. 129, W. R. Beattie.
"Cauliflower and Heading Broccoli Production," U. S. D. A., Washington, D. C., Leaf. 130, J. H. Beattie.
"Production of Eggplant," U. S. D. A., Washington, D. C., Leaf. 131, J. H. Beattie.

Economics

Of special interest to those associated with the fertilizer industry and scientific agriculture is the excellent tonnage report published by the Mississippi State Department of Agriculture, "County Fertilizer Data: Mixed Goods and Materials." For a number of years the State of Mississippi has prepared and published this information in tabular form, indicating the consumption of fertilizers by grades, materials, and by counties. According to the report covering the period July 1, 1936, to June 30, 1937, 148,460 tons of mixed goods were sold in Mississippi. In addition to this, 103,641 tons of nitrogenous materials, 40,099 tons of phosphate materials, and 8,360 tons of potash materials were sold to Mississippi farmers, making a grand total of 300,561 tons of fertilizers. The increase over the previous year was 38% for mixed goods, 26% for nitrogenous materials, 60% for phosphate materials, and 77% for potash materials. The total tonnage in increase was 37%. The leading grade sold in Mississippi from the tonnage standpoint is 4-8-4. This grade alone represented 116,624 tons as contrasted to 94,707 in 1935-36. On a percentage basis, the 23% increase in consumption of 4-8-4 was not as great as the increase in 4-8-6, 4-8-8, or 6-8-4, the increases being 1,563%, 768%, and 1,119%, respectively. The consumption of fertilizers is fairly well distributed through the State of Mississippi. The marked increase in consumption in the state since 1932 reflects largely the improved position of the cotton farmer. However, in spite of the increase which has taken place, Mississippi fertilizer consumption has not yet attained the high levels of 1928, 1929, and 1930, when consumption reached the 400,000-ton mark.

"Some Factors Affecting Citrus Costs, Yields, and Returns," by R. H. Howard, Assistant Extension Economist in Farm Management, University of Florida, presents a very comprehensive summary of the results of a study based upon grove records kept by Florida citrus growers in cooperation with the Agricultural Extension Service of the University of Florida. The study was instigated for the purpose of determining as nearly as possible some of the important economic factors affecting costs, yield, and price on a citrus grove, and of course most important, net returns for owners' supervision.

There is a close inter-relationship between the above mentioned factors; however, it was found that the relationship appeared to be greatest between cost and yield. Good cultural care, which includes the proper fertilizing and use of soil amendments if needed, irrigation during drought periods, economical tillage practices, and pest control measures, affects the costs, yield, and price—inasmuch as the price received depends to a large extent upon the quality of the fruit.

On the second page of the circular is an interesting chart which breaks down the factors affecting the net returns accruing to the owner into cost, yield, and price. Under cost are five major factors of (1) grove management practices, (2) cost of materials, labor, and equipment, (3) taxes of grove, (4) age of grove, and (5) kind of fruit. Under yield is (1) location of the grove, (2) natural adaptability of soil, and (3) cultural care. Under price are (1) supply, (2) quality of fruit, (3) size of fruit, and (4) de-

mand. It is important that the citrus grove be large enough to accommodate the amount of machinery and equipment purchased. Considerable saving can be attained through wise purchasing methods and cooperative effort on the part of a number of growers. It is noted that the amount of organics that can be grown in the grove will depend largely upon the size of the trees and that normally it is more economical to grow the organics than to buy them. The amount of plant food used is one of the most important factors affecting the net returns of the grove. During the depression years, owing to financial strain, growers failed to fertilize their groves adequately, and net returns were severely affected in many cases. Of all the items of cost involved in production, on the average, the amount spent for fertilizer brought greater dividends for every dollar spent than any other item of expenditure.

In order that the effects of fertilization could be studied more accurately, the age of the trees was considered, and it was found that on the average each additional year in age amounted to an increase of 10 to 20 boxes per 100 trees on 145 groves where less than 400 pounds of fertilizer were applied to each 100 trees. On trees of an average age of 15 years, 132 boxes of grapefruit were harvested, and the net returns for 100 trees for the owner's supervision were a minus $9.42. On 134 groves, the average age being 17 years and the average fertilizer application 490 pounds, 214 boxes were harvested, and the net returns per 100 trees for the owner's supervision were $24.94. On 187 groves where the average age was 20 years and an average application of 781 pounds of fertilizer was made, 318 boxes of fruit were harvested, and the net returns per 100 trees for the owner's supervision were $84.62.

Other items affecting the cost are: efficient use of equipment and labor; the amount of pruning as a result of cultural care, and in this connection it was noted that proper fertilization, deep or excessive cultivation, or lack of moisture may affect the amount of pruning necessary; timely pest control; and irrigation. It is pointed out that while irrigation is often expensive, it may be profitable in times of severe drouth. It was found that even though irrigation increased the cost per acre, the net returns per box for the owner's supervision were greater on the irrigated groves than on the non-irrigated groves over a period of 10 years.

From the collective standpoint, the price is affected by the total supply and the purchasing power as measured by national income. There is a very close relation between price of oranges and the national income. From the standpoint of the individual producer, the price received for the citrus is more dependent upon the methods of production and the quality of the fruit.

"Influence of Tenancy on Types of Farming and Agricultural Income by Soil Types, Minidoka Irrigation Project," Agr. Exp. Sta., Moscow, Idaho, Bul. 222, June 1937, Paul A. Eke and Harold F. Brown.

"Farm Leases for Illinois," Agr. Ext. Serv., Urbana, Ill., Cir. 474, June 1937, H. C. M. Case and Joseph Ackerman.

"Illinois Farm Economics," Agr. Ext. Serv., Urbana, Ill., Nos. 26 and 27, July and Aug. 1937, and Nos. 28 and 29, Sept. and Oct. 1937.

"Indiana Crops and Livestock," Agr. Exp. Sta., West Lafayette, Ind., No. 142, July 1, 1937, No. 143, Aug. 1, 1937, No. 14, Sept. 1, 1937, and No. 145, Oct. 1, 1937.

"Practices on Iowa Farms," Agr. Exp. Sta., Ames, Iowa, Bul. 360, June 1937, John A. Hopkins and Wylie D. Goodsell.

"Corporate-Owned Land in Iowa, 1937," Agr. Exp. Sta., Ames, Iowa, Bul. 362, June 1937, W. G. Murray and H. W. Bitting.

"The Baltimore Wholesale Fruit and Vegetable Markets," Agr. Exp. Sta., College Park, Md., Bul. 409, May 1937, R. F. Burdette and S. H. DeVault.

"Commercial Fertilizers, Commercial Feeds, and Agricultural Liming Materials," State Insp. Serv., Univ. of Md., College Park, Md., Control Series 163, Aug. 1937.

"Minnesota Farm Business Notes. County Agricultural Planning," Agr. Ext. Serv., St. Paul, Minn., Mimeo. 176, August 20, 1937, S. B. Cleland and J. B. McNulty.

"Minnesota Farm Business Notes. Crop Price Movements Following Harvest," Agr. Ext. Serv., St. Paul, Minn., Mimeo. 178, October 20, 1937, Rex W. Cox.

"Land Utilization in New Hampshire. I. Problems in the Back Highland Areas of Southern Grafton County," Agr. Exp. Sta., Durham, N. H., Bul. 298, June 1937, Harry C. Woodworth, Max F. Abell, and John C. Holmes.

"Type-of-Farming Areas in New Hampshire," Agr. Exp. Sta., Durham, N. H., Cir. 53, June 1937, Harold C. Grinnell.

"An Economic Study of Land Utilization in Genesee County, New York," Cornell Univ. Agr. Exp. Sta., Ithaca, N. Y., Bul. 668, April 1937, J. N. Efferson.

"An Economic Study of Grape Farms in Schuyler and Yates Counties, Crop Year 1935," Cornell Univ. Agr. Exp. Sta., Ithaca, N. Y., Bul. 670, May 1937, E. G. Misner.

"Economic Studies of Vegetable Farming in New York. I. Market-Garden Farms with Greenhouses, Rochester Area," Cornell Univ. Agr. Exp. Sta., Ithaca, N. Y., Bul. 671, May 1937, G. A. M. Baptist and E. G. Misner.

"Economic Studies of Vegetable Farming in New York. II. Market-Garden Farms without Greenhouses, Rochester Area," Cornell Univ. Agr. Exp. Sta., Ithaca, N. Y., Bul. 673, June 1937, J. L. Paschal.

"Farm Economics," Cornell Univ. Agr. Ext. Serv., Ithaca, N. Y., No. 103, Oct. 1937.

"The Organization, Practices, and Membership Participation of Two North Carolina Farm Cooperatives," Agr. Exp. Sta., Raleigh, N. C., Bul. 311, July 1937, S. L. Clement.

"Official Report on Feed Stuffs, Commercial Fertilizers, and Agricultural Lime and Limestones—1936," State Dept. of Agr., Columbus, Ohio, Bert V. Leas.

"A Study of Land Utilization in Washington and Kent Counties, Rhode Island," Agr. Exp. Sta., Kingston, R. I., Bul. 261, June 1937, Basil E. Gilbert.

"Types of Farming and Farm Business Studies in South Carolina," Agr. Exp. Sta., Clemson, S. C., Bul. 310, June 1937, J. L. Fulmer.

"Analyses of Commercial Fertilizers," Agr. Exp. Sta., Clemson, S. C., Bul. 311, Aug. 1937, H. P. Cooper, Director.

"Milk-Production Costs in West Virginia: II. A Study of the Costs Incurred by 36 Farms in the Huntington and Charleston Markets in 1935-36," Agr. Exp. Sta., Morgantown, W. Va., Bul. 281, June 1937, L. F. Herrmann and G. A. Bowling.

"Agricultural Conservation, 1936. A Report of the Activities of the Agricultural Adjustment Administration," U. S. D. A., AAA, Washington, D. C., G-71, June 15, 1937, H. R. Tolley.

"What About Wheat in 1938?", U. S. D. A., AAA, Washington, D. C., G-72, Aug. 1937.

"Crop Insurance for Wheat," U. S. D. A., AAA, Washington, D. C., G-75, Sept. 1937.

"Farm Solidarity," U. S. D. A., AAA, Washington, D. C., G-76, Oct. 1937.

"Agricultural Conservation in 1938—Why?", U. S. D. A., AAA, G-77, Oct. 1937.

"Charting the Course for Cotton," U. S. D. A., AAA, Washington, D. C., G-78, Oct. 1937.

"Monthly Indexes of Nonagricultural and National Income," U. S. D. A., AAA, Aug. 1937.

Profitable Farming and Life Management

THERE has long been a need for a reference book of a non-technical character on agriculture to help farm people receive more profit from their endeavors and live country life at its best. This principle is set forth in "Profitable Farming and Life Management" (The Interstate Printers and Publishers, Danville, Ill., $2.75), by Wilber J. Fraser, Professor of Dairy Farming, University of Illinois, with an introduction by Thomas Nixon Carver, Harvard University. The contents are easily understood and have a very practical bearing on everyday life.

The book is divided into three parts: I. Profitable Production, II. Rational Consumption, III. Abundant Living. As the author proceeds from chapter to chapter and from one part to the next, a continuity exists in every respect. In all there are 38 chapters in the book. These are rather equitably represented under the classifications shown above. Under "Profitable Pro-

duction" the chief concern is "raising the low factors in production to obtain the most efficient interaction or cooperation between factors and the highest profit from the farm enterprise." "Rational Consumption" has to do with "spending, saving, and investing wisely to accumulate capital in order to raise low factors in production and in life." "Abundant Living" deals with "keeping the vital factors of life high to maintain the most worth while standard of living."

Especially to be noted are the excellent illustrations that contribute a great deal to the reader's interest. Having spent considerable time among the peasant farms in western Europe, the author includes in the book a collection of many excellent photographs of farms in Germany, England, Scotland, and Denmark, as well as typical scenes from different agricultural sections in this and other countries. Each illustration tells an interesting story, even in the well-selected titles used.

Professor Fraser's preparation of this manuscript is not only timely, but it opens the way for an understanding of the principle of balance in estimating the farmer's chances of success. While written mainly in the interest of farmers and laymen interested in farming, the book is suitable for students desiring elementary training in agriculture.

Needs More Than Lime

SOIL treatment for clover is coming to be more than merely a limestone addition, says W. A. Albrecht, of the Missouri College of Agriculture. Soil tests in Missouri, now accumulating to numbers in the thousands, emphasize also the need of phosphorus and potassium.

Phosphorus application on wheat has been commonly beneficial to the succeeding clover for which the wheat is the nurse crop. Most soils in the state are so low in phosphorus that its addition should be regularly considered, not only for the wheat, but for the clover following.

Potassium additions have not been given much attention, though clover failures have been occasioned more often than is believed by the deficiency of this nutrient in the soil. Experimental results and soil tests point to the emphasis that should go to potassium as a fertilizer treatment in helping to guarantee clover. Straw which is rich in potassium leaches out its store of potassium quickly. This is also true of corn fodder.

It is frequently observed that much better clover grows in a ring around the spot where the wheat, oats, or corn shocks stood for a long time the preceding year. The rainfall leached out the potassium and much better clover resulted. When a soil gives such a demonstration, it is evident that a treatment of potassium will help the clover. Manure contains much potassium and helps clover because of this item.

Bacterial soil treatment, as well as fertilizer additions, may help to lessen clover failures. Clover is a legume and cannot make its best growth unless it cooperates with nodule-producing bacteria on its roots. Well-fertilized soil and well-inoculated seeds are necessary for the bacteria to function effectively in helping clover in its use of extra nitrogen from the air. Legumes without nodules are not able to draw on the additional air supply for soil improvement.

Winter Planning Is Step in Better Pasture Program

NO BETTER time than winter months can be found in which Illinois farmers can plan an improvement program for the 8,195,209 acres of pasture land in the state, according to J. J. Pieper, chief in crop production, College of Agriculture, University of Illinois.

This pasture acreage, amounting to more than 25 per cent of the 32,000,000 acres of land in farms in Illinois, is equal to 30 per cent of the land available to crops and is equivalent to nearly half of the area from which crops are harvested.

"In a livestock system of farming, there is probably no better means of reducing the cost of animal products and thus rendering a profit than by the improvement of pastures," Pieper said.

"Outstanding problems are to increase the carrying capacity of low-producing pasture lands, to produce a uniform supply of forage throughout the growing season, to improve the quality of the forage produced, and to manage the grazing lands so as to maintain them in a high state of productivity for a long period."

To increase the carrying capacity of pastures it is necessary to determine the causes of low yields and to correct these deficiencies, Pieper explained. Frequently pastures are located on the poorest soils of the farm, which is often the cause of unproductiveness. It pays to test such land to determine what mineral elements are lacking so that they may be added.

Limestone, phosphorus, or potash may be needed, and less fertile soils will require nitrogen for satisfactory growth of pasture plants. Nitrogen may be supplied by adding manure as a top-dressing or by plowing it under in preparation for seeding, by growing legumes in the pasture mixture, or by adding commercial fertilizers rich in nitrogen.

Where the soil is wet, drainage will help, and if the pasture is badly eroded, terraces may be used. Cultivation and reseeding will be of little value unless the causes of poor stands of grass are corrected. Mowing established pastures to control weeds and thus cause a more rapid development of grass is recommended. Rolling in the spring is beneficial if heaving has been severe.

In producing a uniform supply of forage, the second pasture problem listed by Pieper, it is necessary to see that the soil is maintained in a high state of fertility. This helps to minimize low rainfall, which is the most pronounced cause of poor production. Choice of forage plants which will reach their maximum production at different seasons of the year is suggested. Alfalfa and brome grass are producing well in mid-summer when Kentucky bluegrass and white clover are in a semi-dormant stage. Grazing management together with supplemental pastures will aid materially.

Control Grazing

To improve the quality of forage produced, it is necessary to choose only those plants which are palatable and which have a high nutritive value. For this reason legumes are recommended. Application of fertilizers to correct soil deficiencies will improve palatability and increase the mineral and protein content of the forage. Fairly close grazing will keep the grass in a succulent condition.

Proper management of grazing lands is necessary to give the grass a chance to develop and maintain a high state of productivity for a long period.

Pieper pointed out that grass should be permitted to reach a good growth in the spring before animals are turned onto it. Then too, grazing should not be so close as to cause the grass to die during unfavorable weather conditions. Late fall grazing is as harmful as early spring grazing, since the plants do not have a chance for root storage in preparation for winter.

Alternate rather than continuous grazing is best adapted to most pastures. Burning pastures to control weeds is discouraged, since it is also injurious to the grass. Pastures can be improved only by discovering the cause of low yields and correcting such practices, Pieper said.

Potash Fixation By Muck Soils

EXPERIENCE and experimental evidence have indicated that potash fertilizer added to a soil sometimes is absorbed or held by the soil so tightly that the plant cannot use the potash. Under these conditions, of course, the efficiency of the fertilizer is reduced. As a rule, sufficient extra potash must be added to take care of this absorption, so that some potash will remain in a form available to the plants. Cases have been observed in which small potash applications to soils evidently lacking in potash did not produce any beneficial effect. When larger potash applications were made on some of these soils, beneficial effects were produced.

This strong absorption of potash has been observed more on heavy mineral soils than on lighter soils or peats and mucks. However, the great importance of potash fertilizers on muck soils led G. H. Enfield and S. D. Conner, of the Indiana Agricultural Experiment Station, to study this phenomenon on several types of this soil. Their results were published in the February 1936 issue of the Journal of the American Society of Agronomy. The amounts of available potash in the soil were determined, and known amounts applied. Crops were intensively grown on the soil, and the amount of potash they removed, which is the available potash under most conditions, was determined by analyzing the harvested crop. The results show that some of the potash was fixed, since only 80.7 per cent of the applied potash was recovered in the crop.

When lime was used on acid mucks, potash recovery was improved. This is the opposite to the effect of lime on many mineral soils where it usually reduces potash availability. On high lime mucks, the additional lime had no apparent effect on the availability of potash.

This work shows that provision should be made for possible soil absorption of potash on muck soils as well as on mineral soils, and is an additional argument for making sure that sufficient pounds of potash are applied in the fertilizer to take care of this absorption as well as crop needs.

Brick: "Boy, she certainly gave you a dirty look."

Bat: "Who did?"

Brick: "Mother Nature."

He (shyly): "I'm going to steal a kiss."

She: "Well, let the crime wave begin."

Soybeans like these offer no opportunity for wasting plant food on weeds.

Crops Are Well-fed On Craigmile Farms

George R. Harrison
Valparaiso, Indiana

LAND on the 900-acre Craigmile Farms near Knox in Starke county, Indiana, is kept producing in high. The main crops are mint, alfalfa, soybeans, and potatoes, and the last three named are great consumers of potash. Taking this fact into consideration, Robert Craigmile, the manager, uses 200 pounds of potash to the acre every time he plants one of the potash-consuming crops. Even in the very dry season of 1936 when short yields were the general rule on farms over the Midwest, Mr. Craigmile saw his 90 acres of soybeans yielding an average of 26 bushels per acre, and there was a certain 10-acre plot that made 46 bushels per acre because it had had potash for a longer period of years than the rest.

"For 10 years we have been applying the potash here regularly," said Mr. Craigmile as we stood in the finest field of soybeans I had ever seen. "On the rest of the soybean area, the potash has been used only 3 or 4 years."

Then he told of a 3-acre plot on which onions were grown back in 1928. The hired man was told to put about 400 pounds of potash on that piece, but through his misunderstanding he used twice that amount.

"We still see the effect of its liberal use," said Mr. Craigmile. "The crop yield is much better there. Especially was it noticeable in the 2 very dry

years we had. By that time the potash had been plowed down so deep that it was below the top soil, and roots reaching into it were getting benefit of moisture and plant food at the same time. I have a theory that plowing just as deep as we possibly can every 3 or 4 years on any field is going to work big benefit in this way."

It is mint that made Craigmile Farms a fortune in the first place. Samuel Craigmile, father of the present part-owner and manager, began with it many years ago. Then came the mountain-high prices for the oil with a peak of $25 a pound in the old prosperity years. But 100 acres of mint yielding 40 pounds of oil per acre as $2.50 a pound are still a pretty good bet, according to Mr. Craigmile. However, mint, like other crops, needs rotation. Alfalfa, soybeans, and potatoes are the means to that end while making money on their own account. Hence, the potash for every planting.

The soybeans, with their only fertilizer being potash, develop into tremendous growths after they have been planted in rows 36 inches apart. Then they are cultivated the same as corn and as often through the season as weeds appear. Generally, no matter how much cultivating is done on soybeans, enough weeds escape to show themselves neck and neck with the beans at harvest time. Not so on Craigmile Farms, for what weeds the tractor cultivators miss are pulled by hand. Mr. Craigmile hires enough help to get over 40 acres a day with the weeding process. The result is the cleanest fields of beans anyone ever saw. It means that the plant food put on isn't wasted on weeds. The beans get the full benefit. That makes quality seed for which there is a strong market demand.

"It is cheaper, after my way of thinking, to hire the weeds pulled than it is to harvest and thresh them along with the soybeans," Mr. Craigmile said.

Just as careful is Mr. Craigmile with the potatoes he raises. The rows are kept clean to make easy digging, and then the potatoes are run through a grader that at the same operation brushes off all the dirt to make a product that gets the highest offers.

The picture was taken as Mr. Craigmile stood almost hip deep in the soybeans the second week in August.

New Rice Varieties Have Superior Table Quality

RICE of good table quality, a desirable flavor, and a tender, flaky product when cooked, is the goal of United States Department of Agriculture plant breeders. In cooperative work at the Rice Experiment Station at Crowley, three varieties that have these requirements, Fortuna, Rexoro, and Nira, have been developed and distributed to commercial growers.

Nearly 76,000 acres of the new varieties were harvested in Louisiana, Texas, and Arkansas in 1935, a crop of such superior table quality that growers received an estimated $300,000 in premiums.

Last fall, 116,423 acres of the new varieties, about 14 per cent of the entire rice acreage in the three States, were harvested, a gain of more than 40,000 acres in 1 year. Most of the acreage is concentrated in Louisiana and Texas, where these varieties are best adapted.

The new varieties yield as well as or more than the old established Early Prolific and Blue Rose varieties, says Jenkin W. Jones, department agronomist in charge of rice production and improvement.

Grapefruit By-Products Industry Is Growing Up

HOW the infant grapefruit by-products industry has been growing up in Texas, since the United States Department of Agriculture laboratory was established at Weslaco in 1932, is indicated by figures reported recently by J. L. Heid, of the Bureau of Chemistry and Soils.

In the 1933-34 season, three plants began operations and paid approximately $10,000 for culls.

In the 1934-35 season, seven plants operated paying $70,000 for fruit.

During the 1935-36 season, 17 plants paid $266,000 for 25,000 tons of grapefruit, a return of more than a quarter million dollars from an industry that did not exist 3 years before.

This season, says Heid, the prospect is that citrus plants will pay in the neighborhood of half a million dollars for about 60,000 tons of oranges and grapefruit to be converted into canned juice, concentrates, marmalades, wines, flavoring, beverage bases, and pickled and candied peel.

Food Varies Little As to Quantity; Much As to Kind

AMERICANS have been eating about the same quantity of food for the past 10 years, notwithstanding the great reduction in incomes between 1931 and 1935. But after an analysis of dietary records kept by different types of families, Dr. Hazel K. Stiebeling, of the Bureau of Home Economics, points out that the kinds of food eaten by families at different income levels are very different. Some have had a liberal diet. Others have had to do with very little of the important protective foods. The average diets of families spending $100 or more per person per year for food afforded some margin of safety in all nutritive essentials.

The families studied reported on the kind, quantity, and cost of food consumed. They included those of business and professional workers, wage earners, and low-income, semidependent families. The dietary records collected at intervals since 1914 were taken in every season of the year, in cities and villages, in 44 States, and the District of Columbia, and represented yearly expenditures for food from $32 to $200 per person (spring 1935 price level).

Greater expenditures for food per person are not evenly distributed over all commodities, says Dr. Stiebeling. A greater proportion is likely to go for eggs, meats, milk, butter, and the succulent vegetables and fruits than for grain products, potatoes, dried legumes, and fats other than butter.

A threefold increase in total pounds of food purchased may mean only a threefold increase of milk and lean meats, but a fivefold increase in fruits and vegetables other than potatoes, and in butter and eggs. The groups spending the most for food not only have more food, but food richer in high quality proteins, in minerals, and in vitamins. Some waste is evident with increasing expenditures for food and a tendency to purchase more expensive forms of food; more butter, and a higher percentage of fluid, rather than canned milk.

Fertilizer May Do As Well As Manure for Evergreens

MOST nurserymen have shunned commercial fertilizers for evergreens. They preferred manure even at a higher price. P. C. Marth and F. E. Gardner, of the Bureau of Plant Industry, investigated the grounds for this prejudice and found that well-balanced chemical mixtures are just as satisfactory and cheaper. But they also found some basis for the prejudice because of the tendency to apply too much concentrated food. Applications of chemical fertilizer high in nitrogen were as effective as manure, but heavy doses stunted the plants—caused something similar to indigestion from overeating of food too rich. Nurserymen frequently have failed with commercial fertilizers for evergreens because they gave the plants too much of a good thing.

Better Grass Varieties Aim of Pasture Research

SINGLE grass plants in a pasture do not get much attention because there are so many of them, but a pasture is the sum of the individual plants in it as surely as a crop of corn is the sum of all the corn plants in the field. Farmers seed the more productive strains of wheat and other cereals. But generally they overlook the point that there probably is as much difference in bluegrasses, for example, as there is in wheats. One plant may produce several times as much feed as another, and if all the bluegrass plants in a pasture were as good as the best of them, that kind of pasture might well provide feed for more animals for a longer season.

This is roughly the idea back of Federal and State pasture research. P. V. Cardon, in charge of pasture plants for the United States Department of Agriculture, points out that grass breeding has lagged behind, while cereals have been improved by selection of desirable single plants and by the crossing of varieties to combine the best features of each.

The grass research program of the Department calls for continuing studies of pasture management, fertilizer tests, and seeding methods, but it also provides for special attention to selecting and breeding better varieties of grass plants, kinds that will add up to a larger total in feed value.

We Met the Change in Burley Tobacco

(*From page* 17)

amount of nitrate does not affect quality adversely, but does start the crop quickly, so that it will mature, and can be cut at least 10 days earlier, which is usually an advantage.

In 1928 when the writer came to Switzerland County as County Agricultural Agent, it was easy to see that tobacco was the important crop in the county, and that its improvement would be a sure way to increase farm incomes in the county. Being entirely

ignorant of tobacco production, an immediate start was made to find improved methods of producing burley. This quickly worked down to a study of what fertilizer would produce the type of tobacco the market demanded. A magazine now defunct, *The Burley Tobacco Grower,* gave the results of fertilizer experiments in Kentucky in 1928, conducted by Dr. G. N. Hoffer, which indicated that burley tobacco responded very profitably when the amounts of potash normally used were doubled or tripled.

A grower was found who had been mixing fertilizers that contained muriate of potash and sulphate of potash. He had accidentally found that such a mixture produced a crop for him that sold 10 cents a pound higher than his neighbors' tobacco. Another man was found whose tobacco started growing quickly after transplanting, who explained that he used some nitrate of soda in his fertilizer to start the crop. From this scanty supply of data, this special tobacco fertilizer was evolved.

In 1929 three growers were induced to try it out, D. J. Allen, L. P. Rous, and Wm. O. Protsman. Incidentally, Mr. Protsman has one of the finest quality crops in the county this year, 1937, produced by using this special mixture exactly as recommended. Twenty growers were induced to use the special mixture in 1930, and the following year 65 farmers tried it. This season the mixture was used by half the growers in the county, and by a considerable number of growers in near-by counties.

This stab in the dark as to proper burley tobacco fertilizer fortunately worked out satisfactorily. Its results can best be summarized in the words of H. T. Mylor, a local tobacco grower and dealer, "Using this fertilizer mixture has made the farmers of Switzerland County a million dollars." An exaggeration? Ask a grower who has used it.

Diagnosing Fertility Needs of Orchards

(*From page* 12)

leaves. Chlorophyll is lost from the areas between the veins, but not from the veins and the areas adjacent to the veins. Growth is stunted, and the leaves drop prematurely.

Internal cork and certain types of drought spot in apples are rather widespread in occurrence and appear to be associated with boron deficiency. Various workers in New Zealand (1), British Columbia, New York, and the U. S. Department of Agriculture (5) have reported success in the control of internal cork and drought spot in apples by the use of one-third to one-half ounce of boric acid placed in holes in the trunk of large apple trees, or by application of one pound of boric acid per tree on the soil. With peach trees in boron-deficient sand cultures, the terminals die back, and lateral buds commence growth, but soon become affected. Small irregularly-shaped areas in the leaf die and drop out. Injured leaves fall off readily. On the stem dark brown corky spots appear, giving it a very rough appearance.

Applications of zinc to fruit trees have been successful in combating a disorder called rosette or little leaf (4). The leaves are small, chlorotic, and branch growth is stunted, giving a rosette appearance. In severe cases the trees will die. This disorder is common in California in all tree fruits, and also appears in sections of Oregon and Washington, and in nut trees in Southern United States.

Copper deficiency has been observed in citrus trees in Florida, and in apples, peach, and plums in South

Africa (2). The leaves become chlorotic, the terminals are rosetted, and the twigs die back. Spraying the leaves with copper, or applying ¼ to 2 pounds of copper sulfate per tree to the soil readily corrects the trouble.

Of the eleven elements whose deficiency symptoms have been described, nitrogen is the one commonly lacking under Maryland conditions. The symptoms of lack of nitrogen are easily recognized. Available potassium is scarce on many of Maryland's orchard soils, yet no cases of severe deficiency and injury have been observed, as has been reported in Massachusetts and Canada. However, with available potassium low and lime content high, injury from lack of available iron may occur on fruit trees on certain soils. It is probably the first deficiency to be suspected if chlorosis occurs.

Physical injuries to trees that produce disorders resembling mineral-deficiency chlorosis are common, and winter injury to the crown, mouse injury, or disease, may be suspected when there is a pale or chlorotic appearance. If no injury is apparent on an unhealthy tree close examination of the nature and degree of chlorosis, the pattern of green and yellow areas, the appearance of dead areas in the leaf, the progress of defoliation, and the presence of twig injury may provide clues as to the cause of the disorder.

(1) Atkinson, J. D. Progress report on the investigation of corky pit of apples. The New Zealand Journal of Science and Technology. Vol. 16, No. 5, March, 1935.

(2) Anderson, F. G. Chlorosis of deciduous fruit trees due to a copper deficiency. Jour. Pomol. and Hort. Sci. 10, No. 2, 1932.

(3) Burke, E. Chlorosis of trees. Plant Physiology 7, 329 (1932).

(4) Hoagland, D. R., W. H. Chandler and P. L. Hibbard. Little Leaf or Rosette of fruit trees. V. Effect of zinc on the growth of plants of various types in controlled soil and water culture experiments. Proc. Amer. Soc. Hort. Sci. Vol. 33, 131-141. 1935.

(5) Magness, J. R., E. S. Degman, L. P. Batjer, L. O. Regeimbal. Effects of nutritional treatments on internal cork of apples. Proc. Amer. Soc. Hort. Sci. 34 (1936).

(6) Wallace, T. Some effects of deficiencies of essential elements on fruit trees. Ann. Appl. Biol. XVII. 649-657. (1930).

(7) Weinberger, J. H., and Cullinan, F. P. Symptoms of some mineral deficiencies on one-year Elberta peach trees. Proc. Amer. Soc. Hort. Sci. 34. 1936.

1937—A Cotton Year of High Records

(*From page* 19)

The increase in staple length has been general through most of the Cotton Belt, with the exception of Texas and Oklahoma. The increases have been most apparent in the Southeast and in the irrigated parts of the Southwest.

The average staple length of ginnings from the 1936 crop was greater than for any other crop since these reports were first made. The proportion of ginnings from the 1936 crop 1 inch and longer in staple was greater than for any other year. No consistent change has been noticed in the *grade* of the American cotton crop since these reports were inaugurated.

Changes in the staple length may have been caused chiefly by differences in the growing seasons. Then the Extension Service in some of the states has promoted the planting of better seed, as have seed breeders, farmers' organizations, and others. The promotion of one-variety communities by the Bureau of Plant Industry has been rather successful in improving the quality of cotton in some parts of the Cotton Belt. State experiment stations have studied problems that are more local in nature and have made recommendations. The North Carolina station, for instance, has made a 2-year investigation of the influence

of "cotton rust" on quality and yield of cotton, and advised the farmers that at present additional applications of potash appear to offer the most practical method of decreasing rust damage. Cooperative marketing associations have obtained differences in price for different staple lengths, and this has probably encouraged many farmers to grow cotton of longer staple length. During the last few years, the information on grade and staple length of individual bales furnished by the Bureau of Agricultural Economics, in connection with the compilation of its reports, has enabled the farmers who cooperate in this work to compare the cotton produced by different varieties of seed and thus improve the quality of their cotton.

It is not practicable to measure the separate effect of each contributing cause. The important thing is that the American cotton crop is improving in staple length and, even more important, an increasing quality consciousness has been created among farmers.

Better Yields of Better Cotton

(*From page* 8)

There are certain soil-fertility practices that are followed by those contestants who consistently produce, year after year, an acre-yield of lint above the average of the other contestants. These high producers:

1. Have the soil full of organic matter by rotation of crops, by turning under of legumes, or by use of manure.

2. Have a soil that is only slightly acid, either because of soil type or the proper use of lime material.

3. Have increased the amount of potash used per acre, thus correcting or preventing "cotton rust."

4. Have used readily available nitrogen material as a side application at the time and in amounts needed, as indicated by the growth of the plants.

"Uncle Bob" Smith, Edgefield county cotton grower par excellence, has been a persistent prize winner in the cotton contests. His better half, Mrs. Carrie B. Smith, won first prize in 1936 on 5 acres of her own farm, with "Uncle Bob" as her farm manager. Her yield was 1,328 pounds of 1 1/32-inch lint per acre. This is more than 2½ bales of cotton per acre. On his farm "Uncle Bob's" personal entry in the contest failed to win one of the eight prizes, but with true sportsmanship he declared he wouldn't let her beat him again. His optimistic philosophy he sums up in these words: "Let nothing keep out cheerful persistence; that rule has won me several cotton contest prizes and has helped me learn how to produce cotton."

Intelligent fertilizing, "Uncle Bob" asserts, is a big factor, and potash is most essential in a cotton fertilizer. To be a winner with cotton, he continues you must not only have good land in good condition, but you must fertilize well.

"When I had my soil analyzed by Clemson College, the report was that it was O. K. for general crop production but needed a little more potash," says Uncle Bob. "So I doubled the quantity of potash. In my general cotton crop I use at planting a mixture of 300 pounds of acid phosphate, 100 pounds of muriate of potash, 50 pounds of calnitro per acre, and at second plowing a top-dressing of 100 pounds of calnitro or nitrate. For my 5-acre contest plot I triple this except for soda, using 250 pounds of soda.

"I have no regrets on doubling the potash, for I find it does five things: (1) It relieves rust on cotton, (2) it

prevents 'frenching' of crops, (3) it increases yield through better vigor and vitality of plants, (4) it affects ability of plants to hold fruit, (5) it helps develop bolls and makes picking cotton easier because of fluffiness of cotton in open bolls."

To have plenty of plants per acre to produce good yields, Mr. Smith likes his cotton rows 38 to 40 inches wide, with two stalks per hill about 18 inches apart. This is closer spacing than the old practice, but still not as close as some advise.

His rotation practice is: No cotton following cotton, no corn without legumes interplanted. Thus he keeps his soil fit for cotton or other clean crops.

Other supporters of liberal potash for cotton are P. M. Arant, Chesterfield farmer who won second state prize in the 1936 cotton contest on a yield of 1,253 pounds of lint per acre, and J. F. Hopkins, of Mayesville, who won first prize in the central district on a yield of 1,216 pounds of lint per acre.

Mr. Arant reports that with plentiful potash the cotton bolls on his 5-acre contest plot developed right on up to the top of the stalks, and these upper bolls opened well for easy picking, his pickers finding it possible to gather 35 to 40 pounds more per day per person than in the cotton on the rest of his farm. His contest cotton, by the way, which was 1 1/32-inch staple, sold for 3 cents more per pound than 7/8-inch cotton was bringing.

Mr. Hopkins' fertilizer practice, resulting from cotton contest practices, calls for close spacing—rows 36 inches wide, hills 8 inches apart—and liberal fertilization. He uses at planting 500 to 600 pounds of a mixture analyzing 8-4½-5½ (NPK) and side-dresses with 100 to 150 pounds of equal parts of muriate of potash and nitrate of soda.

Potash Enters the Dairy Business

(*From page* 14)

Carl Ward, of East Flat Rock, in another section of Henderson County, tested some white corn on a 10-acre field, using fertilizer similar to that used by Mr. Corpening. Mr. Ward top-dressed 1 acre with the muriate, and his results are even more pronounced than those secured by Mr. Corpening.

Both men grew their corn on a Toxaway loam soil. "The two demonstrations are very striking," said County Agent White. "We have other similar results over the county and I am of the opinion that potash has just about solved our corn problem for us."

It may be interesting to note that Mr. White is engaged in a lively corn-growing contest with J. A. Glazener, county agent of the adjoining county of Transylvania. Last year, Transylvania won the silver trophy cup offered by a bank in Hendersonville to the farmer growing the highest yield per acre. It was my pleasure to attend the banquet in Brevard, county seat of Transylvania, celebrating the close of the contest last year and to present the cup to a man who had produced 140 bushels. Mr. White said then that the cup would come to Henderson County for 1937, and I now have an invitation to attend the banquet at Hendersonville, when all harvests have been completed and the corn show is finally arranged. Mr. Glazener has also invited me to Brevard.

Potash is perhaps having something to do with a new corn-growing era in these two counties, and it may determine which county I shall visit this winter.

Brawn and Bang-boards

(*From page 5*)

place near Alleman, Iowa, at which time Fred Stanek, of Webster County, beat all comers with 24.3 bushels net. Thumb, palm, and wrist hooks were common in this contest, and the one outstanding thing to mark it was the work of an Illinois farmer, aged fifty-four years, who tossed in about 18 bushels in a field of youngsters.

Next season Illinois got ready in advance with a bunch of tall-geared lads and chose a field where the ears averaged five feet from the ground. Out for blood and deep revenge for two defeats, they sent in a hoss of considerable unknown quantities, named Elmer Williams, and when the dust settled he had hung up a scintillating record hitherto unmatched—35.8 bushels net—and put Iowa's bravest knuckle-scratchers into the discard. His husk weights in 100-pound samples were less than five ounces, and he only missed 28 pounds of merchantable ears en route. He grabbed the ears with his left hand, thumb up, used the right mitt to hold the tip of the ears, and inserted the peg just enough to keep a firm "holt." He banged about fifty ears per minute at times, and they could hardly stop him when the sun went down.

Twelve huskers threw away their shirts and entered the contests of 1926 and 1927, the first being held near Fremont, Nebraska, and the second one near Blue Earth, Minnesota. About five thousand folks attended each of these events. The circle of interested parties was fast widening. Illinois' revenge was short-lived, for back came Fred Stanek and captured both contests hands down. Both times the going was tough, for in Nebraska the crowd followed the huskers in drifting snow, and in the Gopher match the North Star ice-bergs coated the field and every stalk with glass, so that Stanek did no better than he had before. In fact his Minnesota record proved to be the lowest one ever made in a national meet, only 1,083 pounds, hardly worth figuring up, relatively speaking. Besides, in the Blue Earth battle the ears were nubbins, running almost 250 to the hundredweight, making Iowa see red with disgust.

In 1928 Indiana entertained the national meet. The weather and the field were ideal, and few huskers could claim alibis. Illinois got its modicum of revenge again, before eighteen thousand fans. Walter Olson, of Illinois, had his turn basking in the sun of favor, for his was the winning load, about 27 bushels net, with only 19 pounds of gleanings behind him and seven ounces of husks in the sample.

MISSOURI corn-cobbers craved the 1929 engagement, so all the State demons of the crib assembled in Platte County in a nasty field of down corn, partly ruined by a sudden autumn rain. Olson repeated his former victory, but with less glory, making 25.2 bushels net.

Again in 1930 the Southwest claimed the national tournament. Kansas staged it near Norton before thirty thousand sunflower-wearing rooters, and with thirteen huskers at the bat. Here the all-time repeat record was busted, for Iowa money was multiplied in the feat of Fred Stanek, fourth-time victor. He husked and threw in 30.3 bushels in the regulation eighty minutes, leaving 24 pounds of gleanings and only about 11 ounces of husks on the sample. Nobody is quite sure yet how long Stanek will stay in quiet retirement, and his memory haunts the dreams of

all who aim at the tail end of the racks.

Somnolent old Grundy Center, Iowa, awoke to the tread of thousands in 1931, as the huskers converged with their backers on a likely field in the commonwealth where corn is king, queen, jack, and ace combined. Sixteen men lathered up amid the hybrid, and Illinois earned a sweet revenge, getting it through the achievement of Orville Welch, while sixty thousand people parked over ten thousand cars on somebody's alfalfa. Welch threw in about 31 bushels.

ALTHOUGH corn sank to 15 cents a bushel in 1932, Illinois was not discouraged and invited the gang to cross the Mississippi again to learn how fast the ears fly. The attendance slumped 20,000 from the Grundy record the year before, but there were 15 huskers anxious to sweat it out. Here at Galva the winner was Carl Seiler, of Knox County, Illinois, 36.9 bushels with 23 pounds of gleanings about 5 ounces of husks to the sample. Until Carlson arrived, this was the high-water mark in corn husking.

Nebraska's turn to claim the crown came in 1933, when at West Point in that state the champion of the corn world happened to be Sherman Henriksen, a real "cornhusker" in nat'ur as well as name, whose record was 27.6 bushels.

In the season of 1934, Minnesota again opened her gates and furnished a better field and fully fifty thousand onlookers. Eighteen huskers bowed finally to the home-state clipper, Ted Balko, of Redwood Falls, whose bangboard racket netted him a trifle over 25 bushels.

Yet in the 1935 heats over in Newtown, Indiana, Balko finished sixth in a field of the fastest young huskers the world has ever assembled in one pumpkin arena. Elmer Carlson, Audubon County, Iowa, after registering a 35-bushel top in the state event, swung into the fiery stride of fifty-five and sixty ears per minute, with all movie reels running overtime, and clinched the national ahead of Bauman, of Illinois, with 39 bushels, and Pitzer, of Hoosier fame, and his 36 bushels. Carlson threw 4,000 ears for a peak, unbeaten mark of 41.5 bushels. Just prior to the starter gun Carlson donned his tennis shoes, tossed off his shirt, gobbled a double handful of brown sugar, and tore into the 85-bushel-per-acre field with a vim. Carlson is now 28 years old, weighs close to 190 pounds, and is training hard for the 1937 national in Missouri.

The Swedish Carlsons on their 320-acre farm have a complex for corn husking, so when his elder brother Carl set out in 1936 for the state and national trophy, folks kept their eyes on Audubon. Indeed the curiosity was justified, for although Carl was about ten years Elmer's senior, he beat the former Iowa record Elmer had hung up, and in the national contest at a soggy field in Ohio, Carl finally beat all comers and joined his brother in the hall of rural fame.

WEATHER conditions play no small part in the speed and the volume of the huskers. Many State meets have been held with records far above the nationals. The number of ears per bushel, the way the ears grow on the stalks, and the direction of the wind, as well as the amount of moisture in the corn, each contributes its share to make or mar the contest.

At any rate, the old hand method of husking will vanish in a blaze of romantic glory, if it must vanish at all. The annals of the nubbin snatchers will last as long as agricultural tradition treasures its workaday heroes. Making play out of work is one sure method of finishing it minus a grouch.

IT WORKED

Mr. Smith—"Your wife used to be so nervous. Now she seems quite cured."

Mr. Brown—"Yes, and it was so easy. The doctor simply told her it was a sign of age."

An Irishman obtained leave from work to attend a wedding. He returned with two black eyes.

The foreman asked him what had happened.

"When I got there," replied the Irishman, "I saw a fellow all dressed up like a peacock. 'An' who are you?' says I. 'I'm the best man,' he says, an' begorra, he was, too!"

SURE DOES GO

A colored man deposited his savings, some twenty-five dollars, in a private bank operated by some of his dusky brethren. Some time later, he wished to withdraw his simoleons, and appeared at the pay-window with passbook. But the ebony-tinted teller shook his head.

"Yo' cain't draw no money out dis bank, big boy," he announced firmly.

"Why cain't I?" clamored the depositor.

"Yo' money been in heah so long, de interest done eat it all up."

Salesman: "I sell underthings to nudist colonies."

Farmer's Daughter: "What kind of underthings do nudists need?"

Salesman: "Cushions."

THE LAST STRAW

"I don't mind washing dishes for you," wailed the henpecked husband; "I don't object to sweeping, dusting, or mopping the floors, but I refuse to run ribbons through my pyjama jacket just to fool the baby."

The doctor was visiting Rastus' wife to deliver her twelfth offspring. While riding along with Rastus he saw a duck in the road.

Doctor: "Whose duck is that?"

Rastus: "Dat ain't no duck. Dat's a stork with his legs wore off."

COULD YOU?

"Is that Venus?" said the gushing lady.

"No, that's Jupiter," said the Prof.

"How clever," said the lady, "to be able to distinguish the sex at this great distance."

I see by the papers that "Fanny" has passed on; that that posterior portion is now referred to as "Twin Sitties."

It was a warm day, and a dull case concerning the rights of certain river commissioners was being argued in court.

Counsel made speeches of interminable length, and the judge fell into a doze.

"But we must have water, your honor," thundered the defending lawyer in such stentorian tones that the judge came to.

"All right," he mumbled, hastily, "but only a very little in mine."

Potash Deficiency Symptoms

By ECKSTEIN, BRUNO *and* TURRENTINE

(A new publication—248 pages in German, French, and English—profusely illustrated with 55 plates in 4 colors and 41 striking figures in black and white.)

This work presents comprehensive information on characteristic potash deficiency symptoms appearing on the most important cultivated crops. The comments accompanying each color plate make this a very practical hand-book for identifying potash starvation as it appears on 45 different crops.

The first part of the book is devoted to the general symptoms of potash deficiency and includes chapters on: 1—External symptoms and modifications of the inner structure of the plant; 2—Secondary effects of potash deficiency; 3—Potash deficiency and the market value of crops; and 4—Pathology of potash deficiency. The second part is concerned with the potash deficiency symptoms on various cultivated crops, including: 1—Corn and other cereals; 2—Fruit trees; and 3—Vines. The colored plates illustrate potash deficiency symptoms on wheat, rye, oats, barley, rice, corn, alfalfa, red clover, crimson clover, white clover, timothy, canary-grass, horse bean, soybean, sugar beet, potato, turnip, grape vine, apple, orange, tangerine, red currant, gooseberry, strawberry, tomato, onion, carrot, spinach, celery, chillies, cucumber, white cabbage, red cabbage, Brussels sprouts, curly kale, Savoy cabbage, cauliflower, bean, pea, cotton, flax, sugar cane, coffee, tobacco, and peppermint. A colored chart shows the relative removal of N, P_2O_5, and K_2O by 56 different crops.

This book will be of particular value to all interested in the problems of plant nutrition and fertilizer usage, including teachers of vocational agriculture, county agents, research workers, and members of the fertilizer trade.

Bound in half leather . . . . . Price $2.25

B. WESTERMANN CO., INC. **24 West 48th St., New York, N. Y.**

Printed in U.S.A.